

A movie poster for "Journey to Hart's Halo" featuring Lou Hood. The background is a deep blue space with a nebula. Lou Hood's face is in the foreground, looking directly at the camera. To his right is a bright, glowing ring-shaped portal. A hand is reaching out from the right side, about to touch the portal. The title "JOURNEY TO HART'S HALO" is at the top, and "LOU HOOD" is at the bottom.

JOURNEY TO
HART'S
HALO

LOU HOOD

JOURNEY TO
HART'S
HALO

L O U H O O D



This is a work of fiction. All the characters and events portrayed in this book are either products of the author's imagination or are used fictitiously.

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FOR MY FATHER

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ABOUT THE AUTHOR

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The other day, as I was finishing what will be this book's final edit, I collected and sorted old files and correspondence and markups from old edits to be put into storage. I came across some old notes from the very first flash of insight that was to become Hart's Halo; from that instant when I knew that this was the story I wanted to write. The story had a different title; characters known by other names; scenes never developed or that didn't survive. But from the very beginning, it was always written with you in mind.

This was the same day the world learned we'd lost Steve Jobs. Of course we'd all seen it coming. But I was (and am still) heartbroken. I'd never allowed myself to wonder if he'd live long enough to read his name in this story, but I guess I'd always imagined that he would. And I'd always secretly hoped he might get a kick out of it. You only have to read this novel to appreciate what a tech geek I am, and I cannot hope to express how much I admire Steve Jobs. Especially his genius and instinct for design; to build a computer so intuitive that it has risen up to meet us. The Apple is the fruit of the tree of knowledge, and Steve Jobs was its soul.

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“... that dot. That’s here. That’s home. That’s us. On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives. The aggregate of our joy and suffering, thousands of confident religions, ideologies, and economic doctrines, every hunter and forager, every hero and coward, every creator and destroyer of civilization, every king and peasant, every young couple in love, every mother and father, hopeful child, inventor and explorer, every teacher of morals, every corrupt politician, every ‘superstar,’ every ‘supreme leader,’ every saint and sinner in the history of our species lived there—on a mote of dust suspended in a sunbeam.”

— Carl Sagan: Pale Blue Dot —

WAY BACK WHEN: NOVEMBER 15, 2004

“If we have learned one thing from the history of invention and discovery, it is that, in the long run - and often in the short one - the most daring prophecies seem laughably conservative.”

*Sir Arthur C. Clarke: (British expatriate / adopted Sri Lankan)
Science fiction writer and wildly visionary futurist
The Exploration of Space, 1951*

The buzz of energy charging the air can mean only one thing: *He* is in the building.

A supercharged energy surrounds his movement through the lobby and corridors, enrobing him like a cloud, foretelling his arrival.

The buzz precedes his actual arrival by a good ten minutes, so that by the time the elevator opens on the 65th floor of the ultra-modern steel and glass tower, the excitement in the air is almost palpable.

Even though every individual in the company has many reminders each day that they work for him: his name on the building, on their stationery and business cards, on their computer desktops. Still, like static electricity, his physical presence startles.

But only those lucky enough to occupy workstations close to the aisle will catch a brief glimpse. The more bold among them will just happen to be walking the hallways, en route to the water cooler or restrooms, mysteriously having chosen that minute to find themselves in his expected path. This in spite of the fact that for days memos have been circulating, reminding them that he finds excessive attention uncomfortable. And asking that they please be sure not to gawk, gape or otherwise show unwanted interest in his presence.

Inside the plush, high-tech boardroom, an assortment of influential people gather impatiently around the enormous chrome and smoked-glass table. They are awaiting the arrival of their Chairman and CEO.

He is both feared and revered by the members of his board. But none will argue that his visionary thinking has changed the world, while making them all extremely wealthy in the process. They have assembled at his request. A hush falls over the room when he appears at the doorway.

“Good morning, ladies and gentlemen,” he says softly, his voice a throaty whisper. “I thank you for rearranging your schedules to accommodate this meeting. I know how incredibly busy you all are.”

He is mindful that all eyes, and ears, are on him as he rolls through the doorway.

Eccentric twenty-nine year old technology billionaire, Dr. Oliver Hart, tetraplegic since a youthful accident, commandeers the attention of his audience with his mere presence.

An icon of minimalism, his simple black-on-black attire has the effect of rendering him as one with the mass of gleaming black leather and steel technology that supports him. Slowly, he raises his gyroscopically balanced IBOT wheelchair up onto its rear wheels. This puts him at eye-level with the two aides who stand beside him, and has him towering over the board members seated around the table. The effect is daunting.

He wheels over to enormous twin plasma screens at the head of the boardroom and, with the limited use he has of his hands, awkwardly uses his remote to dim the lights, shut the automated blinds, turn off the soothing background music. Complete silence, disrupted only by an occasional uncomfortable throat-clearing as his audience awaits his first words.

“Hart’s Halo,” he says. Nothing more. The echo of his words lingers in the air, tingling like an electrical charge.

With an odd flourish of his remote, Hart launches his multimedia slideshow on the plasma screens. A breathtaking panorama of modern civilization.

His voice, like gravel in a silk purse, transcends the images as he begins his narration: “Thirty years ago, color television had only recently become the standard in every home. Thirty years ago, we were still celebrating having recently put a man on the moon. Today, we have a private sector space program in the becoming stages. Companies like ours will very soon send a privately-built, manned craft into outer space. *Today*, the Europeans put SMART-1 into lunar orbit, and you know what that means. They find water and moon colonization’s next.”

Hart pauses to allow his words to sink in.

He turns his chair to more directly face his audience, enthusiastic and animated. “Paul Allen... Richard Branson... Bill Gates. Steve Jobs. Men of vision. Of energy. Consider the change their vision has wrought these last few years. Just these last few! And imagine how *impossible* their achievements would have seemed, say, thirty years ago?” Another pause.

“Now... play that thirty years *forward*...”

The surround sound emits a luscious, percussive boom, signaling the

reshaping of the tone of Hart's presentation.

"We've gone from requiring a warehouse of tape-drive systems to store what can now be held on this." He holds up a tiny flash disk. "Everything we take for granted: splitting the atom, fax technology, global positioning systems, satellite communications... thirty years ago, if you'd tried telling someone about the world we live in today it *would* sound to them like science fiction. Witchcraft, even." A thin line of white spittle stretched between his lips as he spoke.

"Wireless technology...the *Internet*... for God's sake, the Internet ladies and gentlemen! Only officially an adolescent today...ten measly years ago you'd *never* heard of such a thing. Probably couldn't have conceived of how you'd use it. Now I'll bet you couldn't imagine functioning without it. Could you?"

Silence. Of course.

"Need I go on? Can you not sit there and think back to when you were young, and shake your heads at what a different world it is today?"

Hart's eyes sweep the room, landing on one board member after the next, making grilling eye contact with each; holding it long enough that many of them have to look away or check their watches or notebooks just to break the intensity of his gaze.

"Oh, I know what you're thinking. It's a long way from the Internet to a space project with a thirty-year horizon. And, of course, yes, it is."

In this very instant, each member of the board has two words searing into their minds. This is how Hart operates. They are used to it. Two deeply significant words, dropped just as casually as that. *Space Project*. At least now they know this much about what they are getting into.

"I know I need not remind you how society has already committed itself to large, open-ended and highly speculative investments... fusion power technology... the atomic bomb. Granted, these were funded by governments. But, the fact is, HART Corporation has more money than many of today's world governments."

The screen goes black, and all is dark and silent.

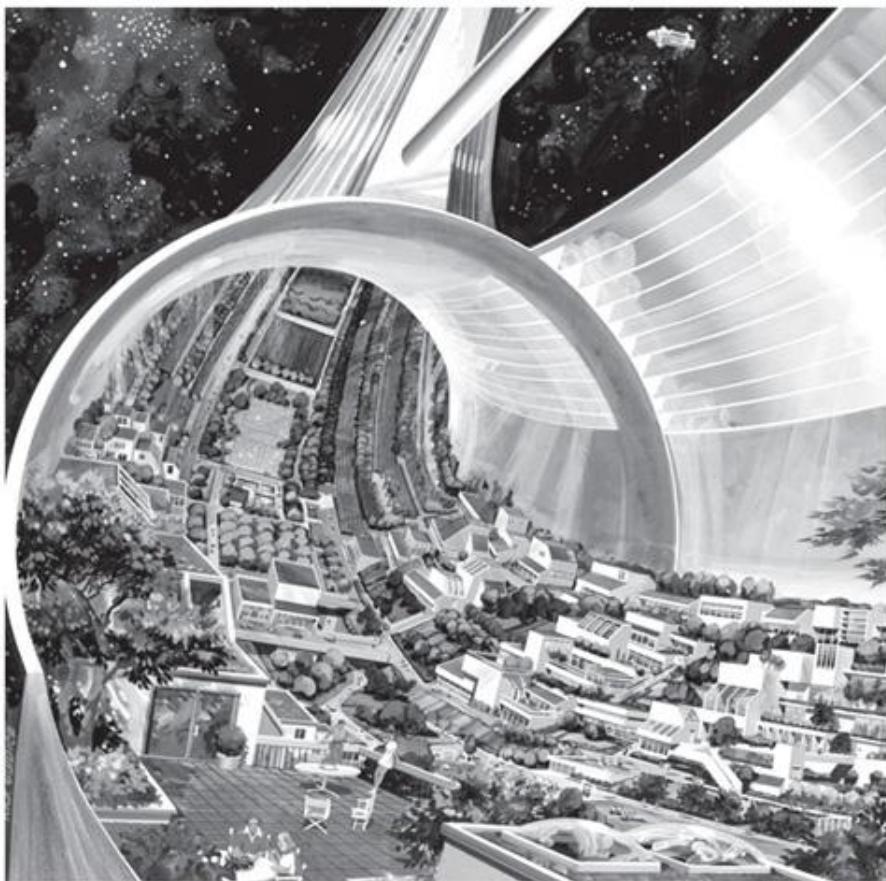
Each and every member of that board is quietly wondering, maybe even dreading, what will come next. Knowing it will be big. Bigger than big, in fact, knowing Oliver Hart as they do.

Not that it matters much. See, this is not a sales pitch. This is a done deal.

Hart's board members are on the edges of their seats with anticipation, while simultaneously scared to death that his vision has finally reached its limits. That Hart's own personal agenda is going to lead them down a path whose financial commitments are so

unimaginably huge, they might spell the unmaking of the corporation they are charged to protect. A thirty-year project? Well, societies have been remade in a span of thirty years.

Suddenly, the darkness is dramatically cut when Hart projects onto the screen the image of a strange object.



The screen is filled by an artist's rendering in luscious pinks, yellows and oranges. It is part of a ring. Its starry, galactic setting clearly suggests that it exists somewhere in outer space. Hugging the outer perimeter of the transparent ring is a low-rise suburban cityscape. Houses, trees, pathways...people!

Hart clears his throat, and focuses his thoughts as he begins to brief his board of directors on his new vision. A vision that will, over the next thirty years, see him establishing an international consortium to construct and realize.

"This, ladies and gentlemen," he begins, with a surprising lack of flourish, "is Hart's Halo. The world's first space colony."

1: HOW LONG?

The idea that anything is possible, that's one of the reasons why I'm a fan of America. It's like... hey, there's a moon up there! Let's take a walk on it! Bring back a piece of it! That's the kind of America that I'm a fan of.

Bono: (Irish) U2 front man, rock legend and unflinching humanitarian 2004 Commencement address at the University of Pennsylvania, where he was being presented with an honorary doctorate degree

Davey hits the pavement, and clicks on the power on his skates. Swoosh: He's really moving now. Past row upon cookie-cutter row of houses just like his best friend Kyle's. Up ahead, at the fork in the road, a monstrous electronic 3D billboard fills the sky. An image of the Halo. Of Dr. Hart. Images so familiar that Davey could close his eyes and recreate them in stunning detail in his mind's eye. Underneath the images, a headline reads:

Wanted: Space Pioneers
No Experience Necessary

And in the bottom corner of the 3D billboard there's a ticker box. It's been counting down for hundreds of days. There are only 12 minutes left on the clock. Next to the ticker, a sign that reads:

Journey to Hart's Halo
Hart's Halo Global Lottery Winners Announced in:
... "tick"...
11 minutes

Davey pulls up under the sign, and stares at it like he has hundreds of times before. He has that same dreamy, hypnotic look all kids with *Halotosis* seem to fall into when thinking about their beloved Halo. But nobody, not a soul, could possibly love the Halo like he does. Of that much Davey is sure. A shock wave runs up his spine, the tingle leaving him feeling weak and light-headed. He slides down to one knee in order to regain his balance. Then onto both knees. He has this creepy, disembodied feeling and runs a hand back and forth through his bristly blond hair, hoping that it might stop his scalp from crawling and maybe even wake him up to feeling back inside his body again.

His gaze shifts up to the billboard once again; gentle blue-green eyes fixing on the giant-sized image of Dr. Oliver Hart. A head and shoulders of Hart, set against the backdrop of the Halo's majestic likeness. Flesh and bone, carbon and water man, creator of a carbon nanofiber world.

In Davey's anxious eyes, dark irises reflect the image of Hart: his hero. On his lips, mumbled words beseech this entreaty: *"Take me with you... please, dear God, take me with you."*

2: HIS MOTHER'S INBOX

Whether you think you can, or whether you think you can't, either way you are right.

Henry Ford: (American) Industrialist and inventor of the modern motorcar

Davey thumped in frustration on the little black box to the right of his apartment door.

“Lousy hunk of obsolete technojunk,” he muttered to himself as he again set his thumb on the scanning pad. The IDentascan entry system was at least as old as he was, and had become increasingly unreliable and troublesome over the last couple of months. If this didn't work, he was going to have to go down to Mr. Cox's apartment and get him to override the system again. And, just his luck, he would probably run into Mr. Cox's bitter and twisted son Finn, which was about the last thing Davey needed today.

“Please, oh please, work...” he whispered, his desperation finding voice. And then, the huff of breath he hadn't known he'd been holding escaped in a release of emotion when the IDentascan beeped. It had accepted his thumbprint and would allow him entry into his own home.

Davey shrugged his backpack to the floor and let the door close behind him. He slipped out of his well-worn denim jacket (emblazoned with Galaxa, his favorite Japanese manga character), flopping the sleeves from his arms each in turn. Grabbing the jacket collar in his mouth, he leaned a hand into the wall and tipped his leg up behind him in order to release the air lock on his left skate. There was a subtle whoosh as the core deflated and the heel cup expanded, allowing his skate to fall to the floor. He sniffed at the urban street-smell of his jacket and crinkled his nose in response. After slipping his second skate off, he chucked the jacket towards the tiny living room where it would slowly, reluctantly, make its way towards the laundry pile. He gently squared his precious micro-machine powered electric skates (two months allowance plus birthday loot plus snow shoveling money), and set them carefully in their designated spot by the door.

Davey stood for a second looking at the ePost on their entry wall. Then he touched and moved through the first stages of the electronic interface. For a second, he paused where a choice had to be made. Not

your run of the mill every day kind of choice... whether to enter his password and access his own INbox, or whether to do the same, only to access his mother's INbox. He felt a rush of excitement and guilt. Then touched the icon that would lead him into his own mail.

Scanning the INbox's electronic homepage, his eyes spotted the GardenMart logo with his mother's name beside it: Carrie Randolph, Assistant Manager. If there was one thing he could count on, it was that there would always be mail from his mom. Using his index finger on the touch screen, he selected his mother's message. Waiting for the message to load, he allowed himself to think briefly about how nice Kyle's family's INbox access was, with that beautiful Central Control Console in their living room and real-time voice recognition. Davey tried not to feel resentful that he and his mother were forced to rely on the apartment's plodding, outdated and barely functional ePost system. He unfolded a stool out of the wall and sat down in front of the console. His mom's note flashed before him on the screen. She'd sent a video message this time, full of smiling sweeties and honeys and a reminder to help start dinner and try to find the time to tidy his pigsty of a room a little.

He touched his way out of the message and was touching his way back through to the home page, when his eyes locked onto the inevitable. His mother's INbox. Her personal mail. Her lifelong online personality, tied to the IDentacard number she, like everyone else on the planet, had been issued at birth.

Bitz sprang into his lap, shocking him out of his guilt for a moment. Of course he knew all along he was going to have to go back into his mother's INbox one last time. The cat began to rub himself eagerly against Davey's chest.

"Hey, boy! Have you been good today?" he asked, tickling the skinny ginger cat behind his ears. The cat rubbed his head up and down as though to say "Yes," pressing himself into Davey's touch. "Me too. Until right now, that is. I got an A+ on my algebra test this morning, you'll be proud to know," he said cheerily. And then added in a conspiratorial whisper: "Though, you know we're going to do it... we're going to hack into Mom's ePost. And no amount of A+s would bail me out if she came home and caught me in her INbox. Again."

For months now he'd had access to his mother's ePost password. Technically, without her knowledge. Originally, it had been not personal gain but self-preservation that had driven him to hack his own mother's ePost password. He had known some mail was coming from a teacher (the dreaded, smelly Mr. Poutine) that he'd, quite simply, preferred she didn't receive. So he had hacked into his mother's ePost and sent the teacher a reply on her behalf... "Sorry Davey was so naughty, Mr. Pootie-Poot... it won't happen again...

blah-di-blah...”

It was her own fault, in a way. She was just so predictable in the passwords she chose. Come on... everyone knew that using birth dates as your password might make them easy to remember, but also made them way too easy to hack.

Mom had been pretty annoyed, to put it mildly, when she'd busted him. When she'd come back from Parents' Night, wagging about that letter he'd sent to Mr. Poutine on her behalf, unmentionable things had hit the fan. She had chewed him out. And grounded him. And he'd lost his gaming and OMNI privileges. And she'd changed her password, of course.

But you'd think she'd have changed it to something other than simply another birth date!

At first her password had been set to his birth date — 09/23/2020. That had taken him about three minutes to crack. Then, after the Pootie Incident, she had ever so slyly changed it to her own — 01/03/2000. He'd used that one when he'd hacked into her INbox to send in their entry into the Hart's Halo Global Lottery. And barely gotten away with it.

When he'd heard the IDentascan's beep and she'd walked through their apartment door that day, about two hours earlier than expected, he had just about fainted with surprise. He'd been caught red-handed.

She had come home with a terrible cold and, at first, was too bleary-eyed to clue in to what she was seeing. But Davey had been an easy read for her, even in her heavily cold-medication-addled state. Instead of just playing it cool, hugging his mom and quickly shutting down the ePost system, he had stuttered and stammered and she had eventually turned her curious attention to the blinking screen in front of them.

She had been mightily sore to see her own INbox open, especially since they'd had such a serious mother-son talk about privacy and honesty the last time he had been caught. He strung together some story about what he'd been looking for in her ePost, because he couldn't confess he was using her identity to enter them into the Hart's Halo Global Lottery. Because she'd already told him no way on Earth were they taking part in that lottery. Never mind that everyone in the world had entered. Okay, maybe not everyone in the world. But certainly everyone in his world. Without exception, everyone he knew that could take part, had. Why they couldn't enter the lottery too, she'd said, was just one of those things that didn't need explaining, because it just was.

3: WHO'S YOUR DADDY?

It's not what you look at that matters, it's what you see.

Henry David Thoreau: (American) Essayist, Poet and Philosopher

Davey gently took hold of Bitz by his shoulders and held the cat up so that they were looking face to face. Bitzy looked perfectly content with this lavish of attention.

“What do you think, boy?”

With his thumbs gripping Bitzy under his armpits, the cat's arms stood straight out in front of him and his little striped face drooped over and leaned on them. Blink.

“You know, today's the day they announce the Hart's Halo Global Lottery winners. What do you think, buddy? Feeling lucky?”

Another patient blink, his rear legs dangling loosely above Davey's lap.

“I guess it wouldn't be too lucky for you if we did win, now would it boy? But you'd like living with Grandma Morris and Chutney, wouldn't you fella?” Davey waggled the cat up and down so that his head bobbed in the affirmative. It made him smile.

“Nope. No kitty cats on Hart's Halo, I'm afraid.”

Davey knew all the rules by heart. He had studied them thoroughly enough, pouring over the lottery application documents many a late night, lost in hope and fantasy.

Given that successful candidates would be spending five uninterrupted years living aboard the Halo, the world's first colonized space station, applicants would also have to meet some pretty strict personal characteristics to ensure the stability and harmony of the space community. Married couples had to have been married for at least two years before applying, and complete a HART Corporation relationship screening. Single parent families, like his, had to offer evidence of the child's ability to travel—either through a death certificate, custody agreement or proof that no father existed on the child's birth records—before they could be considered as potential applicants. And then came the age restrictions, health restrictions... the list went on and on.

Davey knew that it was pure cutting-it-close luck that he and his mother had even been eligible to enter the Halo lottery in the first place. Kids on the Halo must not be older than twelve years of age (effective the fifteenth of September that year... so Davey made the cutoff by a little over a week). This would ensure that, even for the most talented among them, Halo kids could be expected to remain engaged by an elementary, middle or high school curriculum throughout their five-year habitation. The good news was that these kids, his classmates if he were to win his spot on the Halo, would be the senior “junior” Colonists. And, over the next five years, would remain the oldest kids on the Halo as they made their way through high school!

And even with all of these hoops to jump through, all of these conditions—willing to leave pets and wrong-aged children and other family members behind to be able to be a part of the Halo—millions the world over had applied.

Davey knew that HART Corporation planned to draw two thousand names in their global lottery that day. Given an average family size worldwide of about 2.2, this would result in about forty-four hundred people selected from among the millions and millions of applicants. But this in itself was by no means a guarantee that those lucky people would fly. The folks at HART who were running the selection process figured that, after all of the additional screening the lottery winners would be subject to, they would have culled this down to twelve by the time the space ship that would ferry them out to Hart’s Halo was ready to depart.

That was the dream. To be one of the twelve. Twelve places in twelve seats aboard a rocket ship that was going to take twelve incredibly lucky people to live among the three thousand brilliant and privileged scientists and space pioneers who were to spend the next five years living in outer space as the first human space colony.

Davey checked his chrono. He flicked it over to Time Two, where the same countdown clock to the drawing of the Halo lottery had been playing in the background for months. It flashed 00:00:00.

And now, on the one-in-too-many-million chance that their number might have come up, and that there would be a congratulatory email there from the HART Corporation to advise them of their great good fortune... Davey had only to check his mother’s INbox.

Admittedly, his mom must have thought she’d gotten him with the next password. And he had been stumped, for a few days. But that had also made him all the more determined to crack her code. Not because he was a snoop. Well, an electronic snoop sometimes. But not a snoopy snoop.

Sneakily, he had asked his Grandma Marjorie and Grandpa Jim

Morris when their birth dates were, pretending he needed the information for a school project. He knew he was probably on the wrong track straight away, when Grandma'd had trouble hiding her little smile at his thinly-veiled inquiry. He figured his mom had already briefed them to expect a sudden interest in his genealogy. And, not surprisingly, neither of their birth dates had proved to be the new password.

There was one other person whose birth date his mom might consider important enough, or memorable enough, to use as a password. But he couldn't believe that she'd want a password that served as a daily reminder of him, seeing as how she never would as much as talk about him in front of Davey. And Davey certainly didn't know his dad's birth date. He had been just a little more than three years old the last time he'd seen his father.

Hacking *this* password had taken a little more creativity. A little more effort. But, in the end, a shrewd bit of detective work had netted the desired result.

Months before, Davey had found a HOLOphoto in his mother's bedside table. He hadn't known what it even was until, when he picked it up, he accidentally turned it on. He'd nearly dropped it from shock when an image of digitized light projected from its surface. It was like watching a brief 3D movie of light, only with HOLO you didn't need the glasses.

It was, and remained, the only image of his father he had ever seen. He had left it there, of course; he couldn't take the chance that his mother would find it missing. But every now and again, when he'd been alone in the house, he had snuck a peek at that picture.

He didn't know who had taken it. Probably one of his grandparents. But all three of his family members were captured forever in its digitized three-dimensional tones. His smiling mother, stood behind his seated father, her hand resting gently on his shoulder. A baby image of Davey next to him, sat in a high chair, still wearing a spaghetti-covered bib from dinner. The little Davey holding a purple hippo that his mom had confirmed had been a second birthday gift, and remained his tatty bed buddy to this very day. And there on the table, in front of the laughing man whose resemblance to his own twelve-year-old self was uncanny, even to Davey, sat a homemade birthday cake with birthday candles shaped like a three and a zero. Outside the kitchen window, the leaves were a mottled collage of reds and oranges, suggesting a late-autumn day.

So... Davey's birth date was in the end of September. The photo had been taken some time after then, if he already had Harry (the hippo). Thursday night had been spaghetti night in his household for as long as he could remember, and expected this was also true in the days

that, sadly, were inaccessible to his memory. If his dad had turned thirty on a Thursday late in the autumn of the year he had turned two... well, the rest had been a little simple math, a little trial and error... and, voila!

He remembered feeling a funny mix of triumph and sadness when he had entered his father's birth date into his mom's ePost account and hacked it open. To him, it spoke volumes about the hole in both of their lives. And it made him wish once again that his mother was more willing to talk about what had happened with his dad.

"What the heck, Bitz? What have we got to lose, hey puss cat? Live a little?" Davey suggested. The cat looked up at him disinterestedly. Davey touched the pad to initiate access to his mother's INbox, and entered the password... 10/26/1992. He ran his hand distractedly over his short-shorn hair, his gaze insistent, awaiting the system's response.

The ePost folder flashed open, spilling a list of its contents onto the screen. And, judging by the looks of it, none of it would be mail she'd enjoy opening: just bills and more bills. Some even with the little red "urgent" (read: overdue) flags next to them, like the H2 FUEL and Proton Energy bills. But as his eyes scanned the screen, he caught a glimpse of an ePost that carried a logo both incredibly familiar and strangely foreign. His media-saturated, brand-indoctrinated, meme-infected mind immediately recognized the logo as belonging to HART Corporation, and he felt his heart skip a beat. Pitter pat.

An ePost from HART Corporation! Davey was pretty sure he knew about as much as there was to know about HART Corporation, the world's largest technology conglomerate and aerospace manufacturer. Just last term, in fact, he had done some research on the firm for a school project on the economics of privately-funded space exploration. It had been a crushing decision to eventually have to swap topics because of the vacuum of financial information out there about HART Corporation (or, at least, the privately-held arm of the organization that was the corporate umbrella for the Halo's development). A tough decision only slightly buffered by his startling discovery that HART Corporation was, among a multitude of other things, his landlord! (Well, many times removed through subsidiary and holding companies... but still, his landlord!)

For Davey, the knowledge that he was somehow a tiny little cog, a completely inconsequential spec, in the world that was HART Corporation, had brought him a strange satisfaction. Just one of the thousands upon thousands of apartment dwellers like he and his mother—and commercial tenants, industrial tenants—in cities all over the world. Yet Davey felt a strange sense of, well, of belonging, to

HART Corporation. And Davey liked the feeling that he was a part, even in such a microscopic way, of the world's largest international conglomerate, parent to hundreds of high-tech, aerospace, entertainment, land development and property management firms. He liked the feeling of being somehow connected, even so remotely, to his hero: Dr. Oliver Hart.

For Davey's mom, who'd been writing rent checks to the property management subsidiary of HART Corporation for seven years now, HART most likely represented a necessary evil. A cost of living she could barely afford, ever since his dad had disappeared and they'd left California and moved into this little two-bedroom apartment in Rednersville, an out-of-the-way suburb of Chicago, in order to be closer to Grandma and Grandpa Morris.

But to Davey, who was mad about anything to do with aerospace, HART Corporation represented a dream unfulfilled. Flight, space habitation... things that seemed so unattainable to a kid like Davey. Such a far off dream with no obvious path between where he came from and where he'd have to get to if he was ever going to have a hope of flying in outer space. He was constantly reminded by his grandmother to not let his dreams get bigger than his britches, whenever he talked about space travel, which didn't seem very inspiring. Nor did it sound like much fun to Davey.

"God, Bitz! Do you think it could be...?" Rationally, he knew there wasn't a chance. At least not more than a one-in-dozens-of-millions chance. Everyone had entered this lottery. Or at least dreamt to.

"Ahhh, it's probably just a *Thanks for entering, but...*," he said, the defeatist in him dashing hopes in its rude, insistent, bellowing voice. But there was also that little whispering hopeful voice inside him that was begging to be heard.

But, to open it was to confirm it. And Davey didn't know if he had the strength just yet to learn that his Halo dreams were over.

He began reciting the text of the ePost: *"Dear Mrs. Randolph...It is with the utmost pleasure that I write to inform you of your family's selection, from among the millions of hopefuls, to earn the chance to live in space with HART Corporation. Your journey to Hart's Halo..."* It took him three tries to get any further.

Your journey to Hart's Halo... the words made him feel all odd and kind of unsteady. But the sound of the beep as his mother's thumbprint authenticated, followed by the clunk of the tumblers turning in the door lock, made his stomach knot up.

4: MEET R LUCKY LOTTERY BOY

Destiny is a name often given in retrospect to choices that had dramatic consequences.

J. K. Rowling: (British) Fantasy author who single-handedly created a generation of readers

Their information package had told them to expect to find a HART Corporation representative waiting for them in the airport greeting area. But Davey had been taken aback to see the black-suited driver holding a placard which read “*Randolph Family*” when they’d arrived at the luggage carousel. Here and there, the terminal was dotted with other men in dark suits, holding placards for *Cameron*, *Morissette*, *Goyo* and *Levy*. A bunch of the lottery winners must have been arriving on that same flight, Davey realized, all connecting through Los Angeles as Davey and his mother had done.

Davey noticed many of the plane’s other passengers, the Halo’s other lottery winners, left the baggage area with their suitcases zipping along untended behind them. He watched in awe as a set of suitcases with built-in laser eyes navigated curbs and bumps, and their tracking devices had them following closely behind a set of triplet girls speaking German.

Pushing his and his mother’s luggage on a cart, Davey walked along a few paces behind the girls. He noticed the electronic billboard on the baggage area walls change from an ad for the latest tween girl pop idol, to an ad for his favorite immersive HOLOgame, called *Mystic*. As he continued following their driver, Edward, in the direction of their car, he looked behind him to see what the billboard ad would change to for his mother, as she pulled up the rear. Laundry detergent. He smiled. Figured.

They exited the tiny Hartland Airport into a fine sunny California morning. Davey and his mother, full of nervous excitement, squinted into the dazzling sunlight. Davey tried to ground his giddy emotions as his eyes searched for a focus on this new view of the world.

Davey couldn’t help but cringe a little when Edward insisted on relieving both him and his mom of their borrowed, mismatched and ill-worn baggage that Davey had wheeled out. Edward loaded the bags into the trunk of his hydrogen hybrid car before opening the door to usher the Randolphys kindly into the back seat. Edward’s incredibly

gracious treatment of them, which surprisingly felt more embarrassing than exciting, had Davey feeling as though they were minor celebrities or something. It suddenly occurred to him that they were in fact celebrities of a sort, since the eyes of the world had turned upon them less than 24 hours ago, as two of the four thousand, three hundred and fifty-three lucky lottery winners in the Hart's Halo Global Lottery.

Davey was surprised to find the sour bile rising once again in his throat at the mere thought of the previous day's "Hart's Halo Lottery – USA" press conference—one of the dozens of such press conferences, with lottery winners from locations the world over, that had been beamed by satellite to a personally disappointed but vicariously thrilled audience of millions. The intensity of the hundreds of camera lights was but a small reflection of the intensity of the gaze of the world that was now upon them. It had all been too queasy-making, and the mere thought of it had him feeling woozy all over again.

Oh, get over yourself! he silently berated himself. *This is what you wanted, remember? What you dreamed of? Think of how lucky you are!* he told himself.

Oh, yes, he was lucky alright. Crazy, one-in-a-bajillion-lottery-winning kind of lucky. The kind of lucky he'd never, ever, imagined in his wildest dreams. Oh, well... maybe in his *wildest* dreams. But never did he ever believe something like this might actually happen to him in *real life!*

But, as Davey was achingly aware, that luck was going to have to hold. It *had* to. If he and his mother were to make it through what was sure to be a wild weeding-out process. A winnowing of those over four thousand winners down to only twelve. Twelve nobodies. Could'a been anybodies. Who would become, magically, somebodies, when they were offered a place in history. The American Idol winner of a space habitation prize.

Yep...it was going to have to be rabbit's feet...

and four-leaf clovers...

and horseshoes...

and crossed fingers, all the way.

That, and some wits and skill and endurance, for sure. Not to mention a healthy physical and psychological profile.

Davey knew, intimately, the hoops they'd now have to jump through. *Knew* these, in the same way that every kid, and grown-up, with *Halotosis* (and there were hundreds of thousands of them) *knew* it. Knew everything, every little scrap, there was to know about their beloved Halo.

He snatched a brief glance at his mother as she stepped, purse clutched tightly to her chest, through the car door Edward held open for her. Looking at her, Davey felt, and not for the first time, a most

unwelcome feeling. He tried to squish it down. It was a feeling that seemed to come over him whenever he considered his mother and Hart's Halo together in the same thought. One that said (disloyally, guiltily): It's not you, you have to worry about. It's her.

The drive out to the Hartland compound took less than forty minutes that time of day, through scrub of sagebrush with scattered groves of pinyon pine and juniper. For most of it Edward was reasonably chatty, giving Davey a little overview of his life at Hartland. Davey's mother took the opportunity to rest, having spent most of the two airplane flights in abject terror with her white knuckles gripping the armrest between them.

Davey watched her for a moment, surprised at how frail and tired she looked. She seemed pale and her blonde hair looked thin; almost scraggly.

They wound around the base of a stout red mountain and Davey's heart skipped a beat as the sprawling Hartland campus came suddenly into view in the wide open valley beyond. Fenced along the perimeter, Hartland quickly revealed itself as an expansive engineering facility dedicated to the beauty and efficiency of aerospace flight. Davey marveled as he took in a vast acreage of low-lying huts and airfields. Aircraft, some like nothing he'd ever seen or read about (and he'd seen and read plenty), dotted the dusty strips adjacent to the long concrete runways. Outbuildings and hangars that existed in support of the airstrip lined the field.

As they followed the outer boundary around the enclosed terrain, toward the complex's main entrance, a cluster of buildings became visible. Four or five stories tall, they graced the horizon. Scattered masterpieces of concrete and glass.

Davey leaned forward into the side window, only just beginning to process his excitement.

"Boooost!" he said, nodding his head, awed by his first images of Hartland. And then fell immediately silent.

"What's that, Davey?" Edward asked as he looked for him in the rear-view mirror, expecting Davey's comment held some question directed at him.

Davey only mumbled unintelligibly by way of reply and sank back into his seat, horrified by his blurt. This was something he had probably been doing for a long time but had only recently become painfully conscious of. An annoying personality trait. A mouth that got ahead of his mind. A leaky valve that allowed stream-of-consciousness thought to escape unfiltered.

Edward's smile, caught in the rear-view, was forgiving, but Davey slunk into his seat and folded his arms.

When they reached the gates, Davey noticed a small line-up of cars just like Edward's. Two or three were idling before them, waiting their turn at the fortified guard shack.

"Won't be a minute now," Edward said. "Just a little hold-up at security. Do you have those Visitor Passes they gave you in your welcome package?"

Davey rooted through his mother's carry-on, disturbing her from her nap, and handed the Visitor Passes over the seat to Edward.

"You'll need to get some ID out as well. Your IDentacards. Though, they are going to do some biometrics on you. So you won't need the cards anymore once you're loaded into the system."

Like everyone else that populated the planet, Davey's and his mother's entire identities were encoded on a sturdy, twistable, immensurable card that held all of their public record (like, driver's license) and personal (say, banking, or vaccination history) information. In his lifetime, Davey had never been without one. Davey's IDentacard number had been assigned at birth: a region code (815 for Southern California, where he'd been born, though they'd moved to Rednersville, Illinois to be close to his grandparents after his dad... well, once their family had become just him and his mom), a six-digit family code (011235 for the Randolphys of Southern California), and his eight-digit birth date (09/23/2020). Theft-protected by thumbprint, the cards also held a built-in anti-theft device where, once reported lost, the card would send a wireless signal over the OMNI and locate itself. Davey handed his card over the back of the seat for Edward.

"Biometrics?" Carrie Randolph asked as she pulled the carry-on bag onto her knee and sorted through, looking for her ID. "I don't see why that could be necessary? I mean, IDentacards are good enough everywhere else." Davey looked at his mother closely, wondering why he sensed a nervousness that, by now, with the flight behind them and a brief nap to calm her jangled nerves, should have long since dissipated.

Carrie continued, "What kind of biometrics are we talking about here?"

"Simple stuff. A retina scan. Nothing to it, though. Just a quick peep into the hand-held unit and you're good to go."

Davey glanced out the window toward the security booth. They had moved up by one car, and Davey had a clearer view into the security area. Up ahead, the guards were emptying a vehicle of people and belongings.

"Are we going to have to walk from here?" Davey asked.

"What?... Oh, no," Edward replied, having noticed what Davey was referring to. "They're just going to put you and your bags through the

Sniffer.”

“Sniffer?”

“Uh-hunh. Security Sniffer. That’s what they call the mass spectrometer. Can detect parts per billion of all kinds of stuff: drugs, explosives... anything, really. On your clothing, your person, even in your bags. Just a precaution,” he added unnecessarily.

And with that, their car arrived at the front of the queue. Their identity and credentials established, Davey and his mom were escorted from the car by a heavily-armed and armored security guard. It felt as though they were entering a highly sensitive government or military setting, not the property of a private aerospace company.

The guard led them over to a reinforced steel doorway. Davey was surprised when the guard began, with no warning, to pat him down. He stifled a laugh at the sheer ridiculousness of it! But his smile slowly slid off his face when he saw his mother’s expression as she grudgingly endured the stark humiliation of having a strange, also heavily-armored, woman frisk her.

The guard asked Davey to remove the object from his front pants pocket. He inspected Davey’s keyring. One key, dangling from a Swiss army knife-style tool that he used to fix his temperamental but precious micro-machine powered electric skates. Davey looked at the solitary house key dangling from the keychain, and was momentarily overwhelmed by the passionate desire to exchange it for a key to a Halo home. The man tagged the pocket keychain and told Davey that it would be available for him to pick up when he left Hartland in a few days time.

Davey heard his inner voice instinctively asking, hoping, praying, pleading, that he wouldn’t be picking up his keyring anytime soon, as this would signify his failure to have earned a slot on the Halo.

As the guard filled out the claim check for his knife on an electronic Tablet, Davey looked over to his mother. The female guard stood facing her, a small book or journal or some such thing in her hands. Davey briefly wondered why his mother would be carrying a book on her, instead of in her purse or luggage which had already gone through the Sniffer. As the guard leafed through the journal, she looked up assessingly, under the lid of her cap. Davey could see that she was questioning his mother, though he couldn’t hear their exchange. His heart caught in his throat. He wondered sickly if the guard saw, and understood, the same disquieted, almost fearful look on his mother’s face. What *was* she so afraid of? Was this *still* leftover frazzled nerves from the trip? He certainly hoped so. And that she’d get over them. And *soon*. Because they were too close now. The very notion of what she *might* do, what she *could* do... that would... his heart flip-flopped at the thought.

See, the thing was, he knew she was doing this only for him. Which was wonderful and kind and giving of her. But, as it turned out, it was ultimately frightening too. Because anything to do with outer space, much less the thought of living in it, was not fantastic but wildly fearful to her. She hadn't wanted this. Truth was, she was dreading it and he knew it.

But *he* wanted this. Very much. And nothing could come between him and that Halo now. Not now.

He'd already put everything on the line to get this far.

The thought of it churned in his belly; a mix of shame and worry.

He wasn't surprised to feel, however, that nowhere in there, among the shame and the worry, was a single drop of regret.

Newsflash, he silently thought... *Dateline: Hartland... Lucky Lottery Boy is a Lying Hacking Crumb.*

5: WHAT SAY WE GET OFF THIS ROCK?

Some place where there isn't any trouble. Do you suppose there is such a place, Toto? There must be. It's not a place you can get to by a boat or a train. It's far, far away—behind the moon—beyond the rain—

*Dorothy: as played by Judy Garland in a film by Victor Fleming, based on the novel
The Wizard of Oz by L. Frank Baum*

“This is it,” Edward pronounced, pulling up finally in front of a three-story, glass-fronted modern structure that would be Davey and his mother’s home for the next four days. Four days... during which they would undergo a battery of physiological, psychological and whatever-else testing to establish their capacity to both travel to, and spend the next five years living on, Hart’s Halo.

“Too right!” said Davey, meaning it, as he jumped from the car.

Edward led them into a bright, spacious entrance way that so far-outshone the Randolphs’ own apartment building lobby it wasn’t even funny. It was as though they had already made the transition to another world, even another planet.

Davey spun all around, soaking it up. It was almost all too much to take in, in just one viewing.

But then he looked up, into the luminously bright glass ceiling of the atrium.

And there she was.

Hart’s Halo.

In 1:72 scale. About 15 metres across. Awesome and magnificent.

And frightening beyond all description. Not the sight of her, you understand... but the *promise* of her.

Beside the Halo, tiny by comparison but no less recognizable, were Alpha and Omega, simulating a docking. The two Reusable Launch Vehicles would be used to ferry the 3200 member Zero Colony, four hundred at a time over eight launches, out to the Halo for their five year habitation.

Davey basked in their beauty.

An “Oh, man...” leaked from between his lips. Edward smiled at Davey’s reaction.

Davey circled the atrium floor, eyes to the sky, better to examine her from every angle. He wasn't sure how much time he'd spent enraptured by the Halo model, soaking her up, but some minutes later Davey became vaguely aware of Edward's subtle attempts to regain his attention. He slowly, reluctantly, withdrew his mesmerized gaze.

"Hunh?" he said to Edward, his look a blind stare, because his thoughts stayed stuck behind, clinging to the model for a moment or two longer.

Directing them to their left, Edward walked them down a bright, freshly painted corridor that smelled of productivity and newness. Toward the end of the hallway, Edward stopped and set their bags down, withdrew a key-pass from his pocket, and opened the door to a dazzling, if modestly proportioned, living space.

"We'll get your entry door programmed to real-time voice recognition for you both before the day's out, but these'll do you for the time being," he said, handing Davey two key-passes.

Holding the door to their accommodations open, Edward stood aside and ushered them in. Davey took their bags from him, and put them in the largest of the bedroom areas, which Edward had indicated to him. Edward gave them a brief overview of the accommodations, leaving them with a reminder to review their agenda and meal service on the INFOtron console in the center of the main living space. "We support flex-meals here," Edward said. "So there's no rigid meal times. You can fit 'em around your schedule, which is gonna be busy."

Before making for the door, Edward quickly demonstrated the INFOtron's functions. At his touch of a button, a ghostly floating wall of light emerged from the tabletop console. The gorgeous, rich luminosity of the medium melded with the informational content of the INFOtron, creating a hyper-visual display. Textured, yet in the weirdest way not at all tactile. Edward seemed to read Davey's impression. "Boost, hey?" Edward said, smiling. Davey flushed, but nodded his approval. He'd never seen anything quite like it.

Edward touched his way through a few menus to demonstrate the interface. To Davey, it looked like Edward was simply wagging his hand in the colored light. But he soon began to see how some kind of point-and-select process was a part of Edward's movements. "And you can connect the VIDphone through here too," he told them.

"Most excellent" was Davey's starstruck reply, his little technology-loving heart all a-flutter.

The moment the door closed behind Edward, Davey made a beeline to his new bedroom. He stood at the doorway to the room. It was compact, to be sure, but not much smaller than he was used to at home. Davey felt a fluttery, jittery feeling, something between dread and delight—he couldn't tell which. Like he wanted to love it here,

but was afraid to love it too much.

The room was bare essentials: just a bed, dresser, desk and chair, with a small area in the corner full of beanbags and cushions. All the furniture was of that pre-fab-molded-high-tech-material variety, in stark white and bright orange. While he would never have chosen orange for his room color, had he ever been asked his opinion, he nonetheless found the effect totally pleasing.

Davey nipped into his mother's room (bright yellow) to where their luggage lay. She was already busy unpacking. He immediately found what he was looking for from among his belongings, and returned to his room with them tucked inconspicuously under his arm.

First, he placed his own, much smaller scale, model replica of Hart's Halo carefully on his bookcase. He had invested countless painstaking hours in its detailed reconstruction, imagining himself living inside the Halo as he built it up around himself. To Davey, it represented an achievement. Looking at it anew, from where he stood today, he felt a tugging in his chest as this dream ached its way slowly into reality.

Next, he hung a poster on his wall and then stood back from it a bit to ensure it was level. He thought about the immense vision; the incredible marshalling of genius and inspiration; the hundreds of brilliant minds, of kindred hearts, that Hart had dedicated to the task. Over the last thirty years, he knew, Hart had fought naysayers, horrific project incidents and scientific calamity. And yet, he had pulled it all together. From that legendary day—the date of conception—when Hart brought the Halo's premise to his petrified Board of Directors. A day, now near mythical in proportion among Halo buffs the world over—when Hart challenged his board to share his vision. To a day they probably never believed they would see. The Halo was ready. And right on schedule to boot.

Davey threw himself down onto one of the beanbag chairs and surveyed his little space with pride. He wasn't at all sure he had ever had so much new stuff all his own. No... he was sure. He hadn't.

And then he reminded himself, wistfully, that *this* wasn't all his own, either.

No matter. These things were all what you made of them.

And there he sat, mesmerized for the I don't know how-manyeth time by the dream that was Hart's Halo. This time, though, he felt the strangest, most surreal sense of belonging. Of kinship. With the one man who made it seem that being a puzzle-loving, math and space and physics geek (as he knew Hart to be, and of course intimately knew himself to be) could be the ultimate in cool. Not that he'd ever felt the ultimate in cool, that is.

Again, this by-now-familiar entreaty escaped his being, racing up a path from his very soul, through his heart, to his lips: *Take me with*

you... please, oh please, oh please dear God, take me with you.

His mother poked her head in the door frame.

"You say something?"

"Hunh? No. Me? Nope."

"Nice rooms, hunh?" she said, walking a tentative few steps into his.

He suddenly realized he'd left his last, most treasured, possession on the bookcase beside his Halo model. In full view. He jumped up, putting himself between his mother's sight line and the HOLOphoto.

He'd taken that HOLOphoto he'd long ago found buried in his mother's bedside table, and had eventually spent three weeks allowance copying it for himself when he'd become haunted by the fear that she'd one day notice hers disturbed. The only photo he had of his father. He stepped back a bit, closer to the bookcase, and nonchalantly turned around and nudged it into a spot on the bookcase that was outside of his mother's view. He turned back around to face her. He would find a better, more private place for it soon.

"Yeah. Nice," he replied. He tried to suppress his awkwardness, knowing that he'd always been such an easy read to her. He was a lousy liar. Always got caught out, it seemed—if he didn't confess first, that is. He wondered, and not for the first time, whether he was more transparent or she was more perceptive.

"Davey..." she began, and the gravity of her voice, in just that one word, told him this wasn't going to be any casual conversation. "I know I haven't made this easy for you. And we haven't had much time to talk about it."

"S'okay Mom."

"It's been a real flurry of excitement," she said, smiling, though in his heart he knew that this was the kind of excitement she could happily live without.

"Yeah," Davey said, wondering where this was all going.

"We haven't really stopped since that moment, have we?" she asked. Not waiting for a reply, she continued reminiscing, "That ePost was *such* a surprise. And then... it's like we stepped onto this treadmill or something?"

"I know. It's been crazy, hasn't it?" he agreed. "Especially crazy for you, I guess. Seeing as how it must have caught you so off guard? I'm sorry about that, Mom," he said, meaning it.

"You can stop apologizing, Davey. We're here now."

"I'm sorry, Mom. I don't know what came over me. It's just that I couldn't *not* be a part of it... you know... the whole Halo thing? It's just too huge. Too important. I couldn't just sit on the sidelines."

"I know, Davey —"

"I know... but I *lied* to you. And I let you down," he said, truly ashamed.

“Yes, you did,” she replied, point of fact. “And I *am* disappointed. But I haven’t exactly been entirely truthful with you either...”

“What?” He didn’t know why, but for some reason her words gripped him with a cold fear. Did this have something to do with how nervous and *weird* she’d been behaving?

“Don’t think I don’t know how much this means to you, Davey. But...”

But?...But?!

“You have to understand that... well, it’s all such a stretch for me. I’m really much better closer to Earth, you know?”

There it was. Davey felt ill. He *knew* his mother would never go through with it! What had he been thinking, anyhow? Why had he allowed himself to get his hopes up like this?

“But you are my priority, Davey, that’s the truth of it. You are my whole world, honey.”

She was calling him *honey*... Could this be good news? He felt queasy.

She paused for a moment, considering her words. “I wasn’t going to tell you, ’cause I didn’t want you to get your hopes up or anything. But, a few days before the deadline, I tried to enter us into the lottery myself.”

Davey was stunned.

“But when our entry was disqualified because there was already an entry form submitted in our names, with our IDentacard numbers on it,” she gave Davey a mock-disapproving look, “well, I realized what you must have been up to that day I came home early and caught you in my INbox. And it didn’t take much to put two and two together.”

Davey shrugged, not knowing what else to do. “But... you didn’t say anything? When you found out I’d already entered us. Why not?”

“Hey, so... you know... I’ve been meaning to ask you...” she said, trying, it seemed to Davey, to sound too casual. “How did you know? I mean... how did you ever figure out my latest password? Because you had to have had it to have gone in and read the ePost from HART Corporation on Lottery Day. Because you broke the news to me yourself. Instead of letting me find out for myself, by reading my own ePost, that we’d won a lottery I wasn’t supposed to have known we’d entered.”

Davey got an indescribable electric charge in his sternum, and a simultaneous sickly feeling in his belly. And his gaze stretched into a long, absent stare as he considered his mother’s possible reactions to his having to confess that not only had he hacked her password a *third* time, but that he’d done so with a piece of information he wasn’t supposed to have.

How was he going to explain this one? By telling the truth, which

seemed his only option.

"I wasn't snooping, Mom. Honest! I didn't mean to. Really! This was *months* ago. You were working late. And I was looking for the spare key to Grandma's. I couldn't find it anywhere. So I looked all over," he said, dreading to have to confess yet another invasion of her privacy. "Even in your bedside table."

"And you found... what?... a HOLOphoto?"

"Yeah."

"But, I don't understand. How does that..." her words drifted off on her thoughts.

Carrie Randolph stayed quiet for a few moments, following Davey's explanation of how he'd used the information contained in that one picture and turned it into a birth date for his father.

"Very clever," she said, finally.

He just shrugged. It didn't feel so very clever right now, looking back on it.

"I'm sorry, Davey," she said, not having to explain what she was sorry for. Davey understood.

"Me too, Mom."

She moved in close to him and gave him a gentle hug.

"Of course you realize that, if we do get a spot on Hart's Halo, you are probably still going to be grounded by the time we get up there!"

Davey smiled. "I'm just amazed that you'd still consider going, after all that. After I lied to you and went behind your back and stuff."

"And miss an adventure like this? With you? Besides, what do we have to stay here for? Maybe it's time we both got a fresh start, hunh?"

"Well... yeah," Davey sputtered. "But...but, what about Grandma and Grandpa?"

"Oh, they'll be so proud of you, Davey! You deserve this so much. And as your mother, it's my job to support you in your dreams."

Davey didn't bother trying to hide the tears that filled his eyes as he hugged his mother for all he was worth.

Holding the back of his short-shorn head in one hand, scratching distractedly at his nape as was her habit, she hugged him back. And she whispered softly, distractedly, in his ear, "What'ya say, baby? Howz about you and me try and get off of this rock, hunh?"

6: UR FATE, IN A VELVET-LINED BOX

The biggest question is whether you are going to be able to say a hearty “YES” to your adventure.

Joseph Campbell: (American) Educator and Comparative Mythologist

Sitting next to his mother in what could pass for a doctor’s office waiting room, Davey felt a weird mix of excitement and weariness. But with every day, every tick in another box, he reminded himself, they were getting closer and closer. He tried not to think about how every day, too, the tests and tasks had been getting harder and harder.

Those first days at Hartland were already a blur. Test upon test. Psychological tests (to make sure he wasn’t nuts); physical tests (to make sure he wasn’t ill); endurance tests (to make sure he wasn’t gonna crumble when push came to shove). Davey was pretty sure every part of him, inside and out, had been prodded and poked and examined. He kept thinking they were going to find something wrong with him, and had to force himself to give the idea the shake. Wouldn’t that be ironic, though? If it was *him* and not his mother who pooched out?

Davey looked over at his mother, who was next to him reading an eZine, flipping distractedly from page to page, making those little electronic swoosh sounds that simulated the sound of the pages turning. She noticed his attention had settled on her and looked up to meet his gaze. “Everything okay?” she asked.

He nodded halfheartedly and shrugged, and then startled when he heard the sound of the door opening at the end of the small waiting area.

Instead of the training staff he was expecting, Davey was relieved to see another family of lottery winners enter the small waiting room. Mom, dad and two sons, one of whom was close to him in age and whom he’d met in some of the hour upon hour of briefing sessions the lottery winners had been put through.

The eldest boy was brown-skinned with a head of loose, curly ringlets that drooped forward like a forelock, obscuring his facial expression. He waved in greeting and Davey waved back. Davey was

pretty sure his name was Fabien. He came over and took a seat next to Davey as the parents smiled and nodded to one another.

“G-spin,” he said, in a way that gave away his French origins.

“Yeah. I know,” Davey’s reply.

“We did ze Tube yesterday. So now I’m pretty scared of zis G-spin,” Fabien confessed.

Davey nodded. He and his mother had endured the Tube simulation yesterday as well, which Davey would have to say he had underestimated. Otherwise, he might have suggested to his mother that she skip breakfast that morning.

The Tube was a simulation of the transportation system that ringed the inside of the Halo, providing station access, much like a subway system, to the full circumference of the Halo. From the schematics Davey had reviewed, the Halo’s Pneumo-Tube ran for 3.14 kms, two tubes wide to handle traffic and circulation, and functioned much like a tiny air-driven subway car. The torpedo-shaped cars seated three passengers and glided, after a startlingly quick acceleration, at breakneck speed in the airtight Pneumo-Tube. Davey was enormously admiring of the system, so slick and precise that it ran on its own computer system without the need for human operators in any capacity. On the Halo, a simple biometric scan would both provide and restrict Colonists with Tube access to specific areas of the Halo, and a single safety officer could monitor the Tube from a handheld device, from anywhere in the Halo.

But Davey hadn’t fully appreciated how the acceleration of the Tube would feel to passengers (more intense than a roller coaster stop, only in reverse). And so he hadn’t prepared his mother for the experience. To his regret.

And yet his mom had done fine, all things considered. Unless you counted a little barf as not so fine.

But that was just the Tube.

This morning’s challenge would be the worst of them all. The one he’d been dreading. Not dreading for himself so much as dreading for his mom. The G-Spin! Gulp.

This would be the true test. Simulated space travel. Pulling g. Spinning around in a little tin can until your face was plastered to your skull and your guts felt like they’d crawled up into your throat, squeezing past your lungs on the way up.

Not for the faint of heart.

He wanted to be a space pilot, so the idea of experiencing g was more exciting than frightening. He knew it would take some getting used to, but that he’d need to get good at this if he ever wanted to realize his flying dreams. But his mom had no such dreams. Sure, she could only do as much as was within her own capacity; as much as

was humanly possible. He'd never expected any more than this of his mother, of course. Yet he felt awful that he continued to view her, in spite of his love and devotion, as the potential weak link in their assessment. Even though she really was going far beyond anything he might otherwise have imagined her capable of. His mother: who hated speed, sat out on all amusement park rides, got woozy in the virtual world of HOLOGames. He felt as though he'd catapulted her into a world for which she was not the least bit prepared and only marginally more capable.

He had to give her credit, though. She was being a real trouper. But after the Tube ride yesterday he'd felt certain she was going to ditch it all on him. She'd told him that she'd tapped out her reserves of heroism and didn't think she was going to have what it took to go the whole way. Davey had been halfway aghast, halfway expecting it. Both ways disappointed in his own reaction. He'd behaved like a whiney kid. So what if he was only twelve. He still should have known better than to get all bent and twisted over his mother's dilemma, instead of finding a way to help her work it out. There hadn't been much conversation between them since. But Davey knew she was listening now, so he changed the subject. The less she had to think about the G-spin the better.

"Whereabouts are you from?" he asked, pretty much knowing the answer. While Fabien chatted about his hometown and how jealous his friends were that his family had won the Hart's Halo Global Lottery, Davey realized how little thought he'd given to his fellow lottery winners. They occasionally saw one another and exchanged silent nods of recognition in the hallways and such. But the schedule was just so busy, and the lottery winners seemed to have been given no opportunity to really get to know one another. Davey didn't really mind. He wasn't sure he really wanted to get to know any of them, anyway. It would do no good to get attached.

And besides, Davey found himself supremely self-conscious in their company. It was impossible, he realized, for him *not* to see these folks *both* as his potential rivals *and* his prospective Halo neighbors.

A voice came over the loudspeaker: "*Would trainees Randolph D. and Randolph C. please report to the G-spin chamber, located in the simulator training area, D-wing.*"

Davey stood up and held his hand out for his mother, who seemed a little uneasy getting up.

"Are you sure you want to go ahead... 'cause, if —"

"I'm *doing* this, okay? I said I was going to, and I'm going to."

As they walked the unfamiliar corridors towards where Davey thought the G-spin was located, he found himself momentarily disoriented.

His mother looked around. "It's this way," she said confidently.

Davey looked at her and nodded, but again felt that weird little voice inside of him. The voice that insisted on thinking of his mother as the weak link. That she would prove to be, in some measure, the most formidable obstacle to his Halo dreams. The voice that was right now wondering: *How on Earth does she know the way to the G-spin?*

Carrie Randolph seemed to read her son's curiosity, or sense the question behind his furrowed brow, and she flushed pink for a quick moment before she added, sheepishly, "I guess I spent a lot of time thinking about these challenges," his mother explained, defensively.

But, somehow Davey wasn't buying it. It was too out of character for his mom. There was more to this than met the eye. He just didn't know what, was all.

"What?" she asked, obviously sensing his disbelief. "I must have looked at the info kit and map for these training facilities for hours trying to psyche myself up for this. Guess it all sort of rubbed off on me or something?" She smiled awkwardly and tried to shrug it off.

"Hey... I hear these simulators are run by robots," his mom said cheerfully. "Cool, hunh?"

Though Davey recognized her last comment for what it was—a diversionary tactic—he allowed her the not-so-subtle change of subject. But he made sure his body language expressed the inexpressible. *What are you up to?* his look silently asked. He answered her question with a lukewarm, "Yeah, they're called Droids, Mom."

They continued down the long corridor, but he could not ignore the sick feeling that was growing in the pit of his stomach. Whether it was more worry over his mother's weird behavior, or whether he was gripped by the anxiety of what awaited them at the end of this hallway, he did not know.

The terrible risk of failure (his mother's at least as much as his own) hung in the air like a bad smell.

Two Droids were awaiting them at the end of the hallway. One each took Davey and Carrie by an arm and ushered them into a booth where a g-suit, sized to fit, hung in the changing area. They were then placed side by side in the G-spin capsule; the steel door shut unceremoniously. His mother looked weakly at him and he had barely enough time to process the expression in her eyes when there was a loud *thunk!* and they were moving.

Three minutes in a spinning tin can followed, eyes closed tight throughout. He remembered the sharp inhale of his mother's breath as they had begun to move, and wondered if it was the same breath, escaping in a huge, relieved huff, that she let go when the carriage finally slowed to a jerky stop. Davey had that same uncomfortable feeling wash over him that you get when a merry-go-round stops. That

feeling that your spinning consciousness needs to synch back up with your spinning body. Only times ten.

Davey and his mother were escorted out by one of the two operations Droids. They were led to an exit, and found themselves once again in the waiting room. Though her skin had the unhealthy pallor of low fat milk, Davey's mom offered Fabien and his family a tentative double thumbs-up when their eyes met across the room. She managed to raise a brief smile. With her pale yellow hair and near-transparent physical presence, she looked to Davey like a ghost. He felt an overwhelming sense of gratitude, pride and commitment to their little family, and he threw an arm over his mom.

"Wow. That was really something," she acknowledged.

"No kidding! Worse than any ride I've ever been on. Or imagined for that matter. You, uh... you doing okay?"

"Never better," she said, meaning anything but. "Look, we both know the flying part is *not* my thing. But all I have to do is survive it, right?"

Davey nodded, and hugged her again. "You did great, Mom."

The G-spin training tech that Davey had spotted in the glass-walled control room of the simulator area had followed Davey out to the waiting room. He held out what looked to be the shape of a small box, draped in a red velvet pouch, and handed it to Davey. "I'm to give you specific instructions: You are not to open this until you're back in your quarters?" He framed the statement with the upward lilt of a question.

Davey nodded his understanding, and took the box from him. He looked curiously at his mother and she offered a *who knows* kind of shrug in return. They were told they could now return to their living quarters, and that a golf cart and driver were waiting outside to transport them.

Davey couldn't wait to get back inside and check out what he had been fondling and probing with his fingers their entire ride back to the living quarters. He fumbled with the voice-recognition entry at their door a few times, finding his voice too croaky and trembly for the strict and finely-tuned pattern recognition of the entry system. His mother smiled and gently moved him aside, offering her own unique voice pattern to the door lock's microphone, instead. Holding the door open for him, she laughed as Davey rushed in and headed straight for his bedroom.

His mother entered his bedroom behind him to see him already parked at his desk, removing a small steel lock box from its velvety casing.

Davey looked assessingly at the box. And he felt with certainty that their fate as potential Halo Colonists lay squarely, and quite literally, in his hands. An overwhelming prospect. There would be no one to

blame if he didn't succeed now.

As Davey examined the box, his mother looked over his shoulder. There were three lines of text gently engraved into the lid of the box, and next to that a tiny fifteen-button keypad with what appeared to be a random selection of letters on it. He could hear his mother quietly mumbling as she read the inscription to herself.

A puzzle! A beautiful, fantastic, mind-bending puzzle. He should have known Hart would end it this way, with an expression of what Davey knew was Hart's great passion. Their shared passion. A wonderful, mystical, magical puzzle.

"Hmmm... looks like this one is going to be all yours, buddy," his mother said.

"Why just mine?" Davey asked in a whiney tone that irritated even him. "I'm not Mr. Mensa or something, you know."

"Oh, come on... a puzzle? You love this kind of thing! And Lord knows I suck at it," she added laughingly, but Davey couldn't muster the enthusiasm to return her smile.

"Just think outside the box, Davey... I know, bad pun." She laughed awkwardly and he cracked a weak smile, just to let the poor girl off the hook a bit. "Come on, kid? You're *so good* at puzzles and codes and stuff. This is your *thing*, Davey." She patted his shoulder reassuringly and left him at the little desk in his room, quietly drawing the door closed behind her.

He looked at the box.

A	B	C	D	E
I	N	K	L	H
J	M	G	F	O

Three lines provide every hint you need, one try will do if you take heed.

Five letters fulfill your destiny, the word you seek is plain to see.

Thoughts will take shape, you must rely. What do you figure, what will you try?

And with that, his stream of consciousness began to wrap itself around the puzzle.

I have just one try? One try to get it right. One try will make the difference between remaining earthbound, probably for the rest of my life... and living a complete and utter dream. Davey couldn't imagine having any more hanging in the balance on one decision.

He started by taking inventory. Fifteen letters. The first fifteen letters of the alphabet. A through E were lined up in order in the first row. And then the remaining ten letters were jumbled. He stared long and hard at these two rows, eventually deciding that they were in no particular order that he could see.

Out of habit, he quickly composed a mnemonic memory aid for

these ten jumbled letters:

Is Not Kansas Like Home

Jokes My Guy From Oz

Taking out his computer Tablet and stylus, he scribbled down the mnemonic, then sat back and smiled with satisfaction at it. *Back to the puzzle*, he warned himself. *Don't let yourself get distracted.*

Davey was familiar with Cesar's Box codes. Instead of reading left to right, top to bottom, you read top to bottom, left to right. Though, strictly speaking, this kind of code always presented in a perfect square (3x3, 4x4 etc.), which wasn't the case here. But there was too much at stake. He had to at least consider all his options, and try everything.

Again on his Tablet, he rearranged the letters on the keypad, extracting them in column by column sequence instead of reading along the rows as would be more natural, to see if this provided an all important extra hint. AIJ BNM CKG DLF EHO... Nothing. He had quickly realized that, with the vowels clustered on either end, there was little chance this was going to spell anything intelligible. He set the Tablet aside and concentrated again on the three lines of clue engraved onto the box.

Five letters fulfill your destiny ...

The puzzle's answer would have five letters. He was pretty sure about that.

"I can put all the letters into an anagram builder, but that will give me hundreds of five-letter words. Or... I can rely on the puzzle to lead me there," he argued. Davey continued to read the poem clue.

One try will do if you take heed...

Only one try... that seemed pretty clear. He certainly couldn't flail away at this hoping for more tries if he was wrong the first time. 'Cause, if he read the poem correctly, and he thought he did, the electronics on the box were likely rigged to only allow for one attempt. He would have to go all or nothing on the one try.

One try, and a five-letter word seemed to be what it was suggesting. Did the "*plain to see*" mean that the five-letter word he was looking for was already a part of the clue? That kind of plain to see? He quickly grabbed his Tablet computer and wrote down all the five-letter words in the clue:

THREE

LINES

EVERY

PLAIN

SHAPE

He compared the words to the keypad. No. He couldn't make any of them with the fifteen alphabet keys on the pad. THREE LINES EVERY

PLAIN SHAPE. He stared at the five words for what felt like an hour, but was probably more like five minutes. Again he checked the time.

"Time's a ticking, Davey," he said to himself, sure they'd eventually come and take the box away if he couldn't make a move and solve it.

"I know, I know..." he replied, again to himself.

Davey cupped his chin in his hands and rested his elbows on the table. Strangely, answers often came to him when he could quiet his mind... he wondered if maybe it would help to stop thinking and just stare off into space a bit.

"SPACE? Space has five letters..." His heart raced as he consulted the keypad, but fell quickly despondent again. No "S"... No "P"... *No guessing!* He had to rely on the puzzle poem to do this, he told himself. Wild guesses would get him nowhere fast. But he had to get a toehold to work this out. Davey continued by rereading the third line of the clue.

"*Thoughts will take shape...* what could that mean?" he wondered aloud. "But I have no thoughts," he moaned helplessly under his breath.

"What's that, Davey?" his mother asked. She had slipped back into the room and the sudden sound of her voice gave Davey a jolt of surprise.

"No, nothing Mom. Nothing. Just talking to myself..."

"Having any luck?" she asked hopefully.

"Not really." *That was an understatement*, he thought to himself.

"Well, you keep at it, honey. I have faith in you." She left him to it again, but not before squeezing his shoulder in a demonstration of encouragement that somehow only served to leave Davey feeling more helpless and alone.

He knew he would never be able to forgive himself, nor look anyone that mattered to him in the face, if he let this opportunity slip through his fingers. His stomach did another flip-flop.

He couldn't let that happen.

Resolved, he squared his shoulders, gave himself a quick pep talk, and stared hard at the text until his eyes blurred. Willing his vision back into focus, he found his eyes had settled on one word.

Shape. True: It all seemed to be talking about shape. The whole puzzle seemed to want to speak of shape... *lines... shape... figure...* even *plain* (plane), you could argue... all trying to speak of shape.

Going with this intuition, he began counting out... CIRCLE and SQUARE each have six letters. Then RECTANGLE and TRIANGLE would most assuredly be too big... no, he was headed up the wrong path.

But the five-letter words kept talking to him... THREE LINES EVERY PLAIN SHAPE...

He looked at the puzzle, his mind aching, searching for words that seemed to be put there more as a clue in themselves, rather than as necessary words to explain the process... "*thoughts will take shape...*" again he stared at the series of five five-letter words contained in the puzzle. It all seemed to be hinting at a shape.

But there was no five-letter shape. Was he misreading that clue? Did the answer even have to be a five-letter word, or was that just about the hint words? But if it didn't have to be a five-letter shape, then how would he know which shape to choose?

The poem talked about three lines. Was that in reference to its own three lines of text? With these kinds of clues, there was never anything superfluous or extra just thrown in. Usually everything meant something. "*Three lines provide every hint you need,*" he muttered to himself.

But there was something that made him feel it was also in reference to the three lines of a TRIANGLE... why did this shape reference keep haunting him? THREE LINES EVERY PLAIN SHAPE.

It had something to do with a TRIANGLE. He was just sure of it. He looked at the keypad again, willing it to tell him more.

And then, there it was!

Like a phoenix rising from the ashes. Come to save him from shame and failure. Shaped like an upside-down triangle, the word ANGLE! *One try will do...* if you try ANGLE! *Try...* ANGLE!

Davey didn't even stop to ponder his answer. He knew so completely that this must be it. And if it wasn't, well he was completely out of ideas. So... might as well die trying.

He slowly and deliberately punched in the letters: A N G L E

And a distinct click reported that the tumblers had fallen into place.

His *whole world* had fallen into place.

He called to his mother in a voice that quavered with excitement. She arrived in his room just as he, full of the awe of the moment, was gently, reverently, opening the box. Her hands drew to her lips, and her eyes grew wide.

"Oh, Davey," she said.

Inside, on the velvet-lined interior, lay an object like none he had ever seen. What, by all appearances, looked like a key of sorts. On the head of the key, the numbers 0.36 were engraved. Picking it up, Davey noticed a small white paper tag attached with a wisp of twine.

The tag read: *welcome aboard!*

Never, in all the history of mankind, have two words brought one boy more joy.

7: DREAMWEAVER

Somewhere, something incredible is waiting to be known.

Carl Sagan: (American) Astronomer, science popularizer, and novelist
Pale Blue Dot

Davey had been having increasingly fitful sleeps as the day approached when he and his mother would join the rest of Zero Colony for training at Hartland. Tonight was his last night as Davey Randolph, civilian, before he became Davey Randolph, Halo Colonist. And he'd spent hours thinking about this precipice upon which he stood as he'd lain in bed, trying to fall asleep. Eventually, the old Davey Randolph did fall asleep. And his sleep was deep and dream-laden.

He was in a place he didn't recognize, feeling totally lost and with no idea how he'd gotten there nor how to get home. He turned around, trying to get his bearings, but the only landmark was a big W painted on the window of a storefront. He walked over to get a closer look, and the glass of the window began to wag and wobble and eventually melted away. He walked through the open window and into the store. It was a bookstore.

He pulled one of the books off the shelf, and had been at the same time surprised, and not, to see that the cover of the book had a big W on it. He opened the book to a blank page but, before his eyes, another scene appeared on it. And, without actually stepping into the book, somehow he became a part of that other scene.

Now he stood on a platform that had no sides. Just a little piece of flat space with nothing around it. Not outer space or stars... just nothing. A sweep of nausea came over him as he felt the fear that he might fall off the side into the nothingness. He had to drop to his knees to keep his balance. There, on all fours, in the center of the platform, he found another W.

Davey moved through this strange dreamscape. Moving, but feeling so completely lost all the time. So full of questions that were wordless and pictureless and meaningless... just nauseating questions that hung around so thick and so heavy that he felt as though he could reach out and touch them.

Touch. He was, for a moment, conscious again of the tingle in his hands as though they were waking up. He was waking up.

But his consciousness pulled back into the dream for just another moment. And he saw that the final W was on a wall. He went over to look at it. Closer inspection revealed that it was more liquid than solid. Like it was made up of millions of grains of sand... or, points of light. Yes, that was it... they were more like millions and millions of points of light. Because each point was immeasurably small. And each one was all the colors of the rainbow at the same time. And the liquid moved and swayed, and looked like mercury—though clearly was not mercury—in a W-shaped vessel. As he stared at it, shapes began to form out of the mercury-like liquid. He reached to touch one of them, and his hand melted into the mercury, and went straight through.

He felt astonishment... and the most profound sense of peace and happiness he ever could have imagined possible.

And when he pulled out his hand, it held a key. And his mind was flooded with love for his father. An agonizing, heart-wrenching, totally confusing love.

8: THIS IS THE WAY WE PREPARE FOR SPACE TRAVEL... PREPARE FOR SPACE TRAVEL... PREPARE FOR SPACE TRAVEL...

I'm astounded by people who want to 'know' the universe when it's hard enough to find your way around Chinatown.

Woody Allen: (American) Comedic genius, filmmaker and professional whiner

“Today’s the big day, buddy.” His mother’s disembodied voice sounded from the hallway just outside his bedroom door. He was lying still as stone on his Grandma’s guest bed, his hands extended to his sides. The energy buzzing just beneath his skin’s surface was slowly dissipating, and his body began to accept its awake state.

More than once in the last few months he had woken up from dizzying, dream-laden sleeps to the feeling that the world he was waking up *into* was the dream. In moments like these—his body tingling and electrified—it could take him a good five minutes of lying there still, taking in his surroundings, turning his sensors back on, to realize that, yes, in fact *this* was his world.

This time, Davey felt stuck somewhere between his dreamlike reality, and a dream that felt so achingly real. What had he just been dreaming, that had left him so affected that he felt the pull to go back there? Davey moved his fingers in spite of their tingling response, and began coming slowly back into his body. His mind was drawn back into a dreamy memory of his hand, turning to watery mercury, passing through a wall... but the rest of it was gone, barely that hint remaining.

Only days before, Davey and his mother had seen all their worldly possessions, outside of the very few essentials, either sold at their garage sale or packed up and sent into storage. It would be more than five years before Davey would see any of these stored items again, and he and his mother had both agreed that perhaps they simply had too much stuff if they could part with these material possessions with so little hesitation.

And then they had moved in with Davey's grandparents for their last few days on Earth.

Davey threw his legs over the side of the bed. Bitz sprang into his waiting lap, and began to rub himself eagerly against Davey's chest.

"Hey, boy! You feeling okay today?" he asked, tickling the skinny ginger cat behind his ears.

"This is it Bitz, ol' buddy. What do you think, boy? You gonna miss me?"

Bitzy walked off Davey's lap and sat himself down on the top of Grandma's guest bed, looking at Davey. Bitz always looked Davey straight in the eye when he spoke to him. Blink.

"I know, fella. You're feeling like you've been swept up into something that'll change your life forever. Jeez... can you believe it, Bitz?"

Another patient blink, his rear leg coming up to scratch under his own chin. The cat then chewed on his toenails contemplatively, watching Davey.

"But you know I'll miss you, Bitzy... don't you?" Davey said, and patted the cat gently. Bitzy flew off and out of the room as Davey wiped his eyes with the heel of his hand.

Later that morning, incredibly tearful goodbyes would close a chapter on Davey's life. Grandma, who'd been anxiously anticipating the moment for days now, tried hard to smile and be brave. Grandpa patted Davey hard on the back as he hugged him because he had no words to adequately express himself. Truth was, although Grandma Marjorie and Grandpa Jim were presently in good health, Davey knew this could be the last time they saw one another. Not only might Davey's grandparents not survive his five year stay in space, but there was also the very real possibility that Davey and his mother might themselves not survive their own adventures.

With eyes still red-rimmed from their farewells, Davey and Carrie Randolph boarded their flight to Hartland. Their last earthly voyage for the foreseeable future. Their next trip was going to be a blast, quite literally!

He patted the key in his pocket, wondering what it could be for... perhaps his eventual home on the Halo? That would be cool!

At eight o'clock the following morning, the INFOtron had them listed for a series of registration activities. All of Zero Colony's key players—the engineers, the scientists—had been at work on the Halo project for many years. But it was now time to introduce their families to their future world on Hart's Halo. And, likewise, it was time to bring the dozen lottery winners in to ready them, and train them for

their integration into the Hart's Halo community.

He found himself staring at a young girl about his age in the A – L row next to his. Davey only realized, too late, that he had been gawping, when she offered him a brief, awkward smile. She'd dropped her gaze quickly to her shoes before he could offer his weak, strained smile in return (the best he seemed able to do, given the circumstances).

As they waited, he surreptitiously watched her, afraid to meet her gaze again. He used the safety of her seeming fascination with the floor to stare with little risk of getting caught. Her ball cap tipped slightly forward on her head, he noticed with interest that a small thicket of her shortish blonde hair, dead center on the nape of her neck, had been died a vibrant blue. The same blue as her running shoes: canvas court shoe jobs that looked like they'd come from a vintage store, were it not for their relative newness. The effect made him smile.

That she seemed as uncomfortable with the whole process as he felt gave him a weird sense of kinship. And that she was about his age, best he could figure, had him wondering if she was going to be a classmate, and someone he might get to know. Or if she would be someone who, though sharing the Halo community with him, lived in an altogether different world, as her family's appearance would suggest. It looked as though both her parents were a part of the machine that was Hart's Halo. Although the dad was dressed in a shirt and tie, Davey noticed that he wore a name tag on his white lab coat. *Dr. Arthur Dean*, it read. And her mother was in some kind of ship's uniform, or at least that's what it looked like to Davey's uninitiated eye.

Davey's mother grabbed him gently above the elbow and led him the last step forward to the counter, reining his attention back to matters of more immediate importance.

The woman behind the counter ran Carrie Randolph through a short battery of questions. She printed up a hardcopy, offering it over the counter to his mother. "You'll be able to find this on your ONE," she said. Then, stopping to consider this, she added, "The communications device you'll be receiving shortly. But here's a hardcopy for your reference for the time being."

A ONE! Davey thought. Wow! Boost! Did she mean he was getting a ONE? Or did he just mean his mom would get one... oh, it would be so wasted on her!

Next, they were led by a cheerful young fellow back into a white, stark room. He offered them seats facing his desk, then slid behind the desk into his own comfy chair.

And then he gave them their ONEs.

Of course, Davey knew a good bit about ONE; had even seen one or two—owned by some kids at school whose source of funding was suspect, if you asked him. But until this very moment, he didn't know how much he'd longed to hold one in his hand.

"This will be your lifeline on Hart's Halo. Down here too, for that matter," said the young man whose name tag identified him as *Bob*. "We keep the INFOtron up to date with the *collective* information." Bob framed the word *collective* by hooking his fingers to simulate quotation marks. "But your ONE is going to be your own *personal* communications link. Everything you need to know will be broadcast to you via your ONE. Do, ahhh... do either of you know how to use one?"

A valid question, thought Davey. While most of the civilized world had embraced the ONE, and almost everybody with any financial means on Earth was already way past hooked into theirs, Davey and his mother were, perhaps clearly to Bob, not of significant financial means. "Errr, no... not really" Davey said in answer.

"That's okay. This is the most basic unit, and we've given you the Tablet plug-n-play as well," Bob said, pointing out a tiny clip-on component that was mostly screen, with a mini pop-up telescoping stylus that could be collapsed and stored in the corner. It provided both point-and-click and Tablet-style interface to the compact little ONE. "You can only really use this when you wear your ONE on your wrist. But you just flip your hand over, see... and it connects here... and then it's really like you're holding the tablet on the palm of your hand while you either touch and play, or use the stylus... see?"

"Cool!" Davey knew that there were many ONE "wares"—ONEs as everything from belt clip-ons, to wristband styles, to necklace-type lanyards... the list was endless. There were ONEs with these 3D projection keyboards kind of like the INFOtron. And there was even a touchless interface through these monocle-type thingies, or eyeglass-mounted devices, both of which "read" eye-flicks. But even the most basic ONE, like the unit that sat on the desk before him, was a marvel of modern technology to Davey.

"You can even watch OMNIvision on this little screen," Bob added enthusiastically. "Of course, it's totally wireless access to OMNI; the whole nexus satellite interface system. And here are some instructions in hardcopy to tell you how to access your own personal OMNI data storage cloud, and lead you to the ONE manual we've uploaded there." He pushed a sheet of paper across the desk to Davey. "If you have any trouble, I've taken the liberty of pre-programming my contact information in your ONE. I'm to be your first point of contact the whole time here at Hartland. If you need anything, make me the first person you ask, okay?"

“Okay,” Davey agreed.

“And keep it with you at all times. It’s our way of keeping you up to date and keeping in touch with you, okay?”

“Okay,” Davey said again, distractedly this time. He was looking through the brief set of instructions. He was techie enough to see that they were straightforward. Last thing he was worried about was getting used to his ONE. He was going to be *all over* this baby!

He picked up the unit, felt the weight of it in his hand, and was at least a little bit startled and unprepared to feel the weight of it in his chest. He had thought he would love to have one of these things. A ONE! How blazing was that? Yet here he was with his own ONE held in his tidy little fist, and somehow it felt hollow and unsatisfying. But why? Because he didn’t feel like he really *owned* it? He knew that feeling this way was splitting hairs, but he really couldn’t help it. Silly.

Davey and his mother were then ushered, one at a time, into a circular, closet-like space equipped with little lights embedded in its tubular walls. One by one, Bob stood them on the footprint marks in the center of the room, positioned their arms out slightly to their sides, and told them to close their eyes. When the door was shut on them, beams emanated from the wall of lights and moved a manic little laser dance over their entire bodies. And, just like that, they had been fitted for all of their clothing and equipment for their life on Hart’s Halo.

9: 10^100

I was just guessing at numbers and figures
Pulling the puzzles apart
Questions of science, science and progress
Do not speak as loud as my heart

*Chris Martin: (British) Front man and keyboardist for the UK alt rock band Coldplay
The Scientist*

Davey and the other Halo kids were collected together in the giant auditorium. They were meeting for the first time with the Halo school's headmaster, Dr. Daniel Wainwright, who explained that there would be 1083 kids aged 12 and under on the Halo.

Davey fidgeted during the entire short presentation, his Halo uniform feeling unwelcomingly confining and much more formfitting than his usual school attire. The kid next to him shot him a glance, so he stopped yanking on his pant legs and tried to settle down.

"Our objective is to make your life on Hart's Halo look and feel as normal as can be expected, given the wildly unusual circumstances in which you will find yourselves." Wainwright smiled what Davey read to be his best, most sincere smile.

"Your home life, while certainly set in as high-tech an environment as modern technology can provide, will be 'normal'. The work you do at school will reflect the academic curriculum here on Earth, but will integrate examples and hands-on learning that could only be provided by the unique opportunity that is yours.... by living on a space station, in a biosphere, with a simulated gravitational environment!" Wainwright said, brimming with excitement.

"The microcosm that is your community, and the science that is all around you, will become the fulcrum of your learning world, too. And we are confident that you will find it an extraordinarily enriching and exciting world."

Wainwright showed the students the crest that had been designed for their school (Galaxy International School), the special school uniforms they would be wearing, and even some 3D holographic images of their learning environment, which Davey had to admit looked like a really cool space.

The junior Colonists were then divided into age groups, with Davey's including kids from the ages of eleven to twelve. The nearly

200 kids in Davey's group were given orange name tags to wear, and were led into a separate smaller auditorium across the hall. There they would meet some of the faculty, get an introduction to their curriculum objectives, and learn about the kinds of extra duty work they would be expected to do (all in the name of learning) to assist in the smooth operation of their Halo home.

Three boys sat near the front row in this new meeting space, with an air of self-importance that told Davey they very much wanted to be noticed. Not surprisingly, one of them piped up first when Ms. Fintz, the teacher leading their session, opened the floor to questions.

"Are what you are saying is that some of us, the childs, will be having to pick up garbage or somethings? For this work of... ahh... extra... extra duty?" he asked. His accent was indecipherable to Davey, but thick enough to suggest a homeland very far from Hartland. Not thick enough, though, to disguise the contempt in his question.

"Yes, Mr. Gurov, that's exactly what I'm saying," answered Ms. Fintz, and Davey found himself wondering how Ms. Fintz might already know the boy by name.

A man whose name Davey forgot, but who had also been introduced as a middle-school teacher, added "Perhaps this would be a good time to remind you, young ladies and gentlemen, that the nature of our communal life on Hart's Halo brings with it the need to rethink some of our old assumptions. What I mean is, that life on the Halo cannot, by necessity, work under the same rules and systems as does our life here on Earth. And on the Halo, whether you are the Commander's son," he said, his chin jutting in the direction of the young Mr. Gurov and his companions, "or whether you are the chief cook and bottle washer, you are subject to the same expectations. The very functioning of our Halo environment will depend on it."

Gurov? Davey thought. *Of course! He was the Commander's son.* He'd read a bio on all the Halo's chief crew, and knew that Commander Nicolai Gurov had been on the Halo project since pretty much the very beginning, though he couldn't remember having read anything about him having kids. Clearly, or so it seemed to Davey, Gurov junior wasn't entirely satisfied by the teachers' response to his question. But the question and answer session moved on anyway.

Later that afternoon, the kids returned from lunch to find that they had been broken into yet smaller groups, the results of which were broadcast on an electronic bulletin board at the head of the small auditorium. As Davey scanned the lists for his name among the breakout groups of a dozen or so kids, he felt a mixture of elation and disappointment at his assignment. The good news: It appeared he was in the same group as the girl with the smile from the registration line.

If he'd deduced correctly that the Grace Dean on this list was indeed the daughter of the Dr. Dean he remembered from her father's name tag in line that day. The bad news: He was also in the same group as Alexei, Mikhail and Viktor Gurov—all three of whom he now presumed to be the Commander's sons.

The instructions on the bulletin board told students to find their assigned group number (Davey was in Group Number Six), locate their group's assignment data stick from the table at the head of the auditorium, and then join together with their group members by sitting in one of the seats that had your group number marked on a piece of paper stuck to the seat back.

Davey checked the table at the head of the room, but found that Group Number Six's flashdisk had already been claimed. He surveyed the room, spotted the number six on the wall above the top left corner of the auditorium, with an arrow pointing down to a section of seats below. And his heart sank a little bit when he noticed Viktor and his brothers already there, holding his team's data stick. He slowly made his way up to the top of the stairs, and slid along the row of seats to a spot one row below where the Gurov brothers sat waiting.

"Hey," he said, nodding to each of the boys. They acknowledged his arrival with dispassionate grunts.

Group Six took a few more minutes to finish collecting, until the last of the students had settled into their seats. Davey looked low down the row, spotting first a pair of bright purple canvas sneakers extending from a pair of uniform pants legs. He sat back, needing to look no further. Just knowing that the girl with the shock of blue hair from the registration line was indeed Grace Dean drew a smile on Davey's face.

"Ladies and gentlemen?" Dr. Wainwright began. "The contents of your flashdisk represents your afternoon's group activity. Load it onto a ONE, then set up a group folder and share it among your teammates. Once we dismiss here, you'll devote the remainder of the day to your group task. Find your own workspace to meet with your group, and get stuck into the challenges we've prepared for you. Once you've completed your group assignment, you'll be free to dismiss yourselves. But before you begin, we have a last little bit of business to take care of together." There was a rumble of muttering from within the little groups. Everyone seemed eager to see what their assignment was going to be all about, and to get started on it.

"We have someone who'd like a few moments with you. It's my pleasure, boys and girls, to introduce you to our champion. Our visionary. Dr. Oliver Hart."

Oliver Hart! Davey couldn't believe it. He found himself instinctively sitting forward on the very tip of his seat. *Seriously? Dr. Hart was*

coming here? While they waited for Hart's entrance, he looked about, assessing the reaction of the rest of the kids in the room. If they were as conscious of how profoundly important a man Hart was, they certainly weren't showing it. *We're going to meet Oliver Hart, you guys!* he wanted to shout. But of course (his leaky blabbing valve somehow, gratefully, in check at this very instant) he didn't. *Thank God for small mercies*, he thought.

Davey was taken aback when Oliver Hart appeared on the stage, wheeling across from stage left. Of course Davey knew that Oliver Hart was a tetraplegic. And of course he should have factored that into his thinking... into his imaginings. In neither of the two public photos of Dr. Oliver Hart was he fully revealed. And Hart lived a completely reclusive life. While of course Davey and the rest of the world knew of Hart's condition, nobody but the most inside insiders to Hart's world would have a true image of Hart in their mind's eye.

But in Davey's mind's eye, he had been free to perceive Hart in any way he felt. And to him, Hart felt huge and imposing. Davey realized he had always pictured Hart, even at nearly sixty years of age, as a huge and commanding figure. He hadn't even fleetingly envisioned him as he was: a man in a robotic wheelchair, his torso quite stout in contrast to lower limbs that had withered and atrophied by a lifetime of disuse.

Hart approached center stage, and awkwardly raked a lock of grey hair away from his forehead. Just with the sight of Hart, Davey could feel a swelling in his chest. When Hart began to speak, Davey felt the powerful and hypnotic voice surge through him.

"You are space pioneers," he said. And began by thanking the children for the important role they would play in making his dream—Hart's Halo—a reality. "Each and every one of you is earning a place in history. And I am gratified and rewarded to call you my colleagues." Davey wanted to pinch himself, so incredible was this notion. Him... Hart's "colleague"? Wow!

"But the role you've been chosen for comes with an awesome responsibility. You are an inspiration to your peers the world over... role models. Your life on Hart's Halo will be challenging, have no doubts, requiring your utmost commitment and responsibility. But it is my hope that, five years from now, when we meet again on the other side of our adventure, you will each be able to tell me that it was well worth it."

Hart pressed a button on a remote control. The auditorium lights dimmed as an image simultaneously lit the wall behind where Hart sat. "To succeed in your new world, my young ladies and gentlemen, you will have to leave this old world of ours behind. Your values. Your preconceptions. You will need to be prepared to face anything,

even things you can't possibly anticipate from where you sit today. When I say you are going into a brave new world, do not presume to trivialize my meaning. Hart's Halo is made to look and feel as much like life on Earth as possible, but it will be *in no way* like life on Earth.

The spinning hoop that was Hart's Halo would create its own gravitational environment in the outer ring. But at the center of the sphere, where no centrifugal forces exist to simulate gravity, a g-zero-origin, or "g0o" zone would exist—an ideal zero gravity environment for those with physical disabilities such as Hart's.

As a tetraplegic, he acknowledged that he had an enormous vested interest in space colonization. In an environment like the Halo, a zero-g living space at the center of the ring-shaped Colony would allow people restricted by Earth's gravity to live a more normal life.

They were the trailblazers, he told them. Together, they with the other first Colonists would settle Hart's Halo temporarily. And then, working from both ends—Earth and the Halo—and relying heavily on robotic technology, they'd begin to construct the Space Elevator; a project that would take an additional five years to complete. Hart explained that, as members of the Hart's Halo community, each of them would have jobs other than just being students. Jobs that were important to the overall survival of the Colony. To the success of the space habitation.

"Success on the Halo will hinge on many of the same skills that will determine our success as a species in the future of this world."

Hart moved his chair closer to the audience for emphasis. "Great scientists believe the lack of evidence of other civilizations, known as the Fermi paradox, suggests that technological civilizations tend to destroy themselves rather quickly, not long after they reach our current stage of development. Before becoming a space-faring species. You need only look at the crises humanity has wrought on itself these last few decades to see my point. "Success on the Halo, and success for the evolution of our species, will require that we harness and foster the *right* skills for tomorrow: teamwork, written and oral communication, the ability to anticipate, identify and manage complex problems cooperatively... at HART Corporation, we place emphasis on skills like these. Hyper-human skills that cannot be automated. Like caring, judgment, intuition, ethics, inspiration, friendliness, and imagination."

Without a perceptible signal from his body to his chair, Hart wheeled around to where he was facing sideways. Davey marveled at how he moved with a smoothness and efficiency he hadn't imagined possible of man twinned with machine.

On the screen behind him, the following message appeared:

If : 1024 meg = 616

Then : $10^{100} = ?$

“Aahhh... an excellent question, no? Everyone recognize the second part? It means 10 to the 100th power? Yes indeed...” Hart said, “Takes me back, in the most silly way,” a charming smile of reminiscence lit up Hart’s face, “to when I was your age. Something we should never forget as our life experiences mount around us, is what it is like to be as a child.” Hart’s smile faded slowly, and he seemed suddenly... what? Self-conscious? He adjusted his position in his chair, and continued. “At any rate, who thinks they can answer this question? Anyone? Take your time...”

Davey looked at the screen. A math question? He didn’t think so. If forced to admit it, Davey would have to say he was a math geek. And was currently doing math well beyond the seventh or eighth grade level that would be fair to throw at this audience. Besides... 1024 meg had nothing to do with 616, he knew. Well... he didn’t know why he knew, but it was a piece of information lodged without reason in his personal memory banks, that 1024 meg (or megabytes) was a gig.

There was silence from the audience. And an uncomfortable rustling. But Davey was oblivious to his surroundings. A puzzle? Davey *loved* puzzles. Wildly. Instinctively. Like a mother loves a baby.

Before he realized what he was doing, his hand was in the air. When he noticed Oliver Hart looking at him, he became tingly and anxious and wondered what on Earth he thought he was doing, sticking his hand up like that without thinking about it.

“I’m sorry, young man, but you’re going to have to tell me your name?” Hart said.

At that particular moment, Davey would rather have crawled under one of the auditorium seats and died. But it was far too late for that. “Davey... errrr, Davey Randolph,” he answered sheepishly.

“Well, Davey Randolph... do you have an answer to my question?” Hart asked expectantly.

“Ummm... I guess so. I mean, I think I do...” Where was a rock to crawl under when you needed one? Over his shoulder, Davey could hear Viktor and his brothers mumbling among themselves. Their words were lost, but their tone was unmistakably smug and snotty.

Hart waited a moment. “And, may we hear it?”

“Well... well, it’s just that... the first part? Well... it made me think of this thing?”

“Mr. Randolph, how about if we just restrict ourselves to the answer? You do have an answer for us, don’t you?”

“Yes... I mean, yes sir. That is... the answer is 706006.” Behind him, the unmistakable snigger of superiority. And, on the face of it, Davey did have to admit that his answer seemed weird. But he *could*

explain it.

He found himself looking over toward Grace, who sat about three seats down from him along the same row. She gave him a weak smile of encouragement and he didn't know whether to smile back or throw up, he felt so horrible.

"Correct, Mr. Randolph. Well done," said Hart at last.

Davey's ears felt all hot and he could feel the whooshing of his pulse in his temples. But a smile cleaved his frozen face nonetheless. He caught Grace's eye again and she looked positively thrilled. He didn't think she could have been more excited had she come up with the answer herself. He smiled broadly in return.

"I'm going to leave this question with you, boys and girls. Add this to your group work for this afternoon." Some hurried scribbling on ONEs and Tablets from among the audience members ensued. "And if you haven't figured out the answer by tomorrow morning, you can then ask your colleague, our clever Mr. Randolph, for his assistance. And when you do get the answer, you will understand the expression: *think outside the box*. That is what I want from you, boys and girls. What I need from you. To think outside the box. Your success on Hart's Halo—perhaps even the success of the Halo itself—could very well depend on it."

And with that, Hart was gone.

Dr. Wainwright returned and provided the teams with some last minute instructions, but Davey didn't hear any of it. He was still coming down from his high. Oliver Hart thought he was smart! How he had gone from being plain old Davey Randolph from Rednersville, Illinois, to being Oliver Hart's boy, he would never know. But it felt awesome!

Davey followed numbly when his group got up to relocate for their afternoon activity. Grace must have sensed that he wasn't paying attention and was lost in thought because she had walked past him on her way out of the row and nudged him to come along. Which was a good thing; otherwise Davey might have sat there all afternoon.

On his way out of the auditorium, Davey saw that Grace was hanging back to catch up with him.

"That was awesome," she said, with a huge, perfect smile, her rosy complexion glowing. Her honey-colored hair was parted up the middle and bunched into two short, bristly pigtails. Except for that little swatch of shockingly-colored hair (bright blue the first time he'd laid eyes on her, but was now a vivid purple) that had been allowed its freedom on the nape of her neck. She was tallish, slim and lean, but not in a lanky, skin and bones kind of way. Nor in a sinewy athletic kind of way. But with the smooth curvy lines of a music box ballerina. Davey noticed for the first time how white-blonde her

eyebrows were. And how this gave her an angelic look.

Davey wasn't sure whether it was pride or admiration that gave him that little flutter in his belly, but either way he answered "Thanks," and meant it. They walked and talked, following behind their other group members. Obviously Viktor and the gang had decided where they would meet to begin work.

"You like puzzles? I mean, obviously you do..." Grace seemed a little awkward now. But she quickly found her groove again. "Oliver Hart is a puzzle freak, too. Did you know that?"

"Yeah! I mean, yeah... I love puzzles. And I think I read somewhere that Hart—I mean Dr. Hart—does too." Davey thought about this for a moment. "How do you know that, anyway?"

"Oh, well..." She appeared to be weighing her response. "It's just that, well, you might as well know that my mom and dad are good friends of his. In fact, he's Uncle Ollie to me." She smiled awkwardly.

"Cool!" Davey said.

"They've known each other, like, forever," Grace added. "And I happen to know that he is a puzzle *genius*."

"I'm going to guess you're no slouch yourself. I mean, if you figured out it's a puzzle."

"I do alright. But I didn't have a clue until you came up with the answer. Then I figured it out, sort of going backward from your answer. Very clever, by the way," she added appraisingly. Davey thought that was spectacular. He smiled hugely and then, feeling self-conscious, tried to trim it back a bit.

"What makes you such a puzzle geek," she asked, using what would have felt like a disparaging term coming from someone else but instead felt like a kindness.

"Oh, this'll sound silly, but... I don't know... I've just always been into them. For as long as I can remember, I've gotten a puzzle book for Christmas. From Santa," he said, immediately regretting his impulse to explain too much. He smiled weakly at her but the bloom of a full smile on her face set him at ease.

"Neat," she said. And that sealed it.

The group apparently had decided to convene in the *Librarium*: Hartland's expansive chrome and glass and shelves-stacked-high book museum. It was a tribute to the literary history of science and technology, and one of the world's foremost biblio-archives. Settled now into a corner seating and conversation area, Viktor took up his role as self-appointed leader of Group Number Six. He read over their challenge to the team then closed the viewer on his ONE. "That's crap assignment," was his pronouncement.

His brother, Mikhail, nudged him and eyed Grace, telling Viktor with body language like bulging eyes and floating eyebrows that he

should mind his manners with a girl around. Grace rolled her eyes, but said nothing.

“Maybe we just give to you to do for us,” Viktor said, looking directly at Davey. “What is your name...?” he said as he strained to look at Davey’s name tag, “Random... oh, no *Randolph*, Davey *Randolph*.” Like a couple of sideshow monkeys, his two hulking brothers, Mikhail and Alexei, sniggered their delight at their brother’s cunning wit.

In spite of his heavy accent, Viktor obviously had a decent enough understanding of the subtleties of the English language. And had used it incisively, sharp as a knife, to let Davey know exactly where he felt he stood on the social hierarchy of their group, and perhaps even the entire Colony. Davey’s ears felt all hot again, and that horrible acid feeling that he was out of his element—a rusty cog in a well oiled-machine—burned its way to the surface.

Grace stepped in: “Actually, Viktor, maybe it’s a good idea if we all introduce ourselves. I know you think everyone should know who *you* are, but...” She left the rest hanging out there, open to interpretation. Following her own suggestion, Grace began, and they went around the small group and introduced themselves. Next to Grace was Fabien, whom Davey had met at the G-spin simulation centre when he and his mother were first competing for their lottery spots. Fabien nodded to Davey, and with a bored sounding, French-accented voice he introduced himself to the others. Davey knew the other lottery winners by now: a family of four (Fabien’s), two families of three (one from Canada and one from China), and then Davey and his mother.

Next to Fabien sat a shy Indian girl named Bhuvana, with eyes like shiny new pennies. Then a freckled, red-haired girl whose name sounded like Shavon, but whose name tag read *Siobahn*. And then there was a set of identical Australian triplets named Lizzie, Annie and Frannie. Davey didn’t really know what to say when his turn came to introduce himself, as his name had already been broadcast. So he just muttered “Davey.” And then, finally, the three massive Gurov brothers, who also announced proudly that they too were triplets, though obviously not identical.

“Before we do our assignment, maybe he tell us what the answer he gived Dr. Oliver Hart means first,” said Alexei, once the topic turned back to work.

Davey had no desire to be singled out and shifted awkwardly in his seat. He was grateful and relieved to hear Grace pipe up, “I think what Dr. Hart wanted was that we all try to solve the puzzle on our own first. I don’t think, just because we have Davey in our group, that we can do an end-run and head straight for the solution. Otherwise we fail to appreciate the exercise.”

The remainder of their small group seemed equally dissatisfied as the Gurov boys with Grace's proposal. And Davey was already feeling enough pressure to just want to get the discussion over with, and get the attention off of him for a change. "It's okay, Grace. I mean, you've already figured it out, so I don't mind sharing, do you?" He said this more for the other group members than for Grace's benefit. His dual motivation, he instinctively knew: a) that everyone else should see for themselves that Grace was a smart cookie in her own right; and (yes, selfishly)... b) that they all should know that he wasn't the only one whose mind was wired this way. She agreed, with a gentle shrug and a nod.

This seemed to satisfy his remaining group members. But Davey knew that, for his group to get any benefit from this exercise at all, he needed to walk them through the process—sort of relive it for them—so that they could get a sense of the kind of thinking required to break out of that box Oliver Hart had described.

The simple format of the question, he told them, (a is to b, as c is to ?) gave him his context. This phrasing is an accepted format for lots of different kinds of puzzles, he explained. And he knew they were dealing with a puzzle simply by the impossibility of the first answer... $1024 \text{ meg} = 616$. He understood, and more importantly he *allowed*, that it made no sense. This, perhaps, Davey suggested, would have been most people's stumbling block—presuming that anything Oliver Hart told them *had* to "make sense."

"Well, not only did $1024 \text{ meg} = 616$ not make sense to me, but I also happen to know that 1024 meg, or megabytes, is a gigabyte... or, a gig." He caught the look from one of the brothers and added, "Don't ask me why I remember that kind of stuff... I just do, okay? Just a random factoid. Anyway, the 616 was the clue in all of this, right? The one answer upon which the bigger answer would rest. Gig... 616. It was as simple as that once I'd made the connection!"

Davey could see that he still didn't have everyone on the same page. "There's this... *language*, I guess you'd call it. Called *othblgshezi*. I guess it's a geeky math nerd kind of language," he said laughingly, but Grace was the only one who returned his smile. "Uhhh... anyway, it stands for the letters you can make by typing numbers into a calculator and turning it upside down to read them. One equals i, two equals z, and so on. Except for the upside down nine, which resembles the old Anglo-Saxon letter *eth*, so it makes a TH sound. So, anyway... gig would be written 616 on a calculator and then read upside down. Now that I knew the 'code,' all there was left to do was solve the second part of the puzzle, and give the answer in *othblgshezi*! And ten to the power of one hundred, or one followed by one hundred zeros, is called a googol. So, the numeric answer you'd have to punch into a

calculator to be able to turn it upside down and have it read ‘googol’ was 706006. That’s all there is to it.”

Grace nodded her approval of Davey’s explanation.

“And you got this too?” was Viktor’s question to Grace, his voice a pucker of sour notes.

“Not until Davey gave the answer. And then I was able to piece it together, yes.”

“Well, we perhaps do not have so much time free in Russia, to play with calculators.”

Davey tried to let the subtle rebuke roll off him. Davey had met kids like Viktor before. Kids who thought that by making someone else look like less, they somehow looked like more. Losers. Still, Davey couldn’t help but feel a little stung by what seemed Viktor’s incessant need to take him down a notch or two.

Once Davey’s explanation had settled, and a couple of the group members had tried it out by punching it into Fabien’s ONE, which he’d set to calculator mode (which, in a nod to nostalgia, had been created to resemble the stiff, rectangular seven-barred numeric display of a traditional calculator), they moved on to the task at hand.

“Perhaps this is given to us because of my question in the auditorium,” said Viktor by way of introduction. Viktor read their task: *Imagine that you are to populate the Halo Colonist by Colonist. Prepare a list, in order of priority, for the population of the Halo by trade or profession, as well as providing a rationale for your choices.*

Oh, great, thought Davey. Not a happy task for him, feeling profoundly, as he did, at the bottom of the social hierarchy they were examining. And the discussion that ensued only seemed to force a further schism in the group.

“The scientist who regulate oxygen is more important than guy who picks up garbage,” Viktor was asserting.

“Oh, really?” said Grace. “Had you taken the time to imagine what life would be like on the Halo without waste management? We’re there for five years you realize?” Bhuvana nodded her approval.

“Okay, then, more important than...” he looked around and noticed out the museum window someone at work trimming the hedges in the park across the way. “Certainly he is more important than a gardener,” he said, looking meaningfully at Davey. Did he know that Davey’s mother would be working in the botany division? “That kind of work, you can leave to the robots, no?” Viktor added tartly.

Fabien rose to the challenge: “Really? This is a *biosphere*, bro’—each living thing depends on the others. We need healthy plant life in a certain volume to consume the carbon dioxide we emit, and to provide us with oxygen to breathe. But I guess that is all too complex a relationship for you,” he said, shaking his head, and the curls on his

forelock bobbed. Obviously, everyone's patience seemed to be running thin for Viktor and his self-serving view of the universe.

"Now, Fabien... maybe Earth Sciences weren't a part of those guys' school curriculum in Russia," Grace said facetiously. And then she went one step further to drive her point home, telling Viktor they needn't have worried about his being under age thirteen because he would probably have to repeat grades a few times, anyway (to the unanimous delight of most everyone assembled).

Davey could see that this was going to be a very long afternoon.

10: THE BARF-MAKING INCIDENT OF THE KIDS IN THE G-SPIN

I don't think the human race will survive the next thousand years unless we spread into space.

Stephen Hawking: (British) Theoretical Physicist and present Lucasian professor of mathematics at the University of Cambridge (as had been Sir Isaac Newton before him). Remarkably, he holds this position, and has written many books popularizing theories of the physics of the universe, while being nearly completely physically incapacitated by severe motor neuron disease

Davey explained to his mother, between shovelfuls of his breakfast, that indeed *his pants were on fire*, as she'd termed it, because this morning they had a *free* slot in the Space Camp schedule. What that meant, other than a much needed break from his Halo uniform, was a chance to get some flying in. And he would need to be one of the first to sign up to guarantee himself a slot. The sign up had to be done in person, and there was no sense trying to get there too early (he'd already tried that one)—the simulator training area was closed off until just before seven thirty, and security would shoo anyone away who tried to loiter near the entrance to that part of the training camp before it opened.

Far and away Davey's favorite part of the pre-launch training, or Space Camp, was the flight training. More for fun than out of necessity, the kids of Zero Colony were provided with a selection of elective training activities. Davey, of course, had chosen to spend all of these open sessions in the flight sim.

He was still floating from a compliment he'd received in last week's sim lesson. His favorite flight instructor, a really cool and fun and talented former Canadian Air Force test pilot named Major Paul Kissmann, had told him he had what the fly boys termed "good hands and feet."

But Davey had been pretty humbled by the sim on more than one occasion, even "crashing" it disastrously once with Kissmann by his side. His stomach knotted each time he remembered that flight: Kissmann had reassured him that he'd done incredibly well; the simulator had arbitrarily run him through a really tricky scenario. A good word from Major Kissmann was enough to psych him up for

more effort in the sim, hoping each time to improve on his previous performance.

Flight was one of the skills taught at Space Camp that seemed to come easily to Davey. This melding of skill and aptitude into a talent at the stick did not suggest any kind of special ability in Davey's mind, in spite of the fact that so many of his peers seemed to have so much trouble doing what seemed so natural to him. But Davey's ease and capability with so many of Space Camp's training elements had not escaped the notice of the instructors and trainers involved in running the camp.

He met up with Grace leaving his residential block, in the central concourse.

"No skates down in the training zone!" Grace mock chastised.

"You're just chafed because you didn't think of it. I'm gonna take them off before we get near, don't worry."

"I'm not worried. If you get busted and don't get the sim time, that is!" she laughed. "Besides, these," she looked to her feet, "will do just fine to get me first place in the lineup." Grace turned on her heels while Davey was still looking at her lime green canvas sneakers. He didn't need to look up to know what color the sprig of hair that would be peeking out from between Grace's pig tails would be as he watched her run off ahead.

He skated up to catch her and grabbed both her elbows from behind. "Here. Hitch a ride," he said, and slowed to offer her a place to step on top of the instep of each of his skates. She laughed and backed up a step, onto Davey's skates. And they went laughing and skating along the empty corridor.

As they awkwardly turned a bend, Davey caught site of a familiar outline at the end of the corridor. In sync, Grace simultaneously stepped off his skates as Davey tightened his grip on the backs of her arms and slowed to help her off. And they quickly pulled off into a side corridor for Davey to change out of his skates.

"That guy again. He's always around, man. Some people around here, I'm sure I haven't seen twice, there's so much going on here. But him? He keeps turning up."

"Who? That dude?"

"Captain Creepy."

"Oh him. Yeah."

"Yeah, you know who I mean. What's his name, do you know?"

"I think it's Adam or something, isn't it?"

"Adams?" Davey asked.

"Adam."

"His first name is Adam? A dumb?"

She laughed. "Adam. Camden or something. He is always, creepily,

around. It's true."

"He gives me the willies."

"You can't see his creepy eyes behind his creepy glasses but you know he's staring at you."

"All hiding behind his ball cap and mirror glasses. He's such a spook." Davey threw his lumpy backpack of skates over his shoulder, and they turned back into the main corridor, heading to the tech wing.

As they arrived, each of them stood, in turn, before the retinal scanner that would read their identity and log their place in line (behind two other eager beavers) for the flight simulator. Davey smiled as he entered his name, second on the list for Major Kissmann's sim. "You know that they're making us take a G-spin as a part of the sim time this week?" Grace said casually.

"Hunh?" was Davey's reply. Over Grace's shoulder, he noticed for the first time that the area farther down the same access hall had been cordoned off. He didn't recall the training facility having any restricted areas, but he had to confess he really hadn't paid too much attention to things outside his own immediate interests—namely, the line-up for the sim— whenever he'd visited that part of the facilities.

"Yep. No more free airtime for the video pilots," Grace mocked. "You have to pay to play now," she grinned. "Viktor told me. His dad must have said so, I guess. They don't want to waste the sim time for guys that don't have the stomach for the real thing. So now you've got to pull some g for every so many hours you get in sim."

Davey remembered the G-spin from his and his mother's first visit to Hartland, when they were being assessed for their ability to hold up to the rigors of Zero Colony membership. He remembered, with nauseating clarity, the feeling of being spun at over 60 kilometres per hour in an agonizingly tight 5 metre radius circle to simulate the g-force that squeezed you into your seat, stretching the skin of your face back into a ridiculous grinning thing. The only redeeming feature of the G-spin was that it was the only way to see that you measured up to a Mach 26 (or about 8 kilometres per second) launch into outer space, the speed needed to escape the Earth's gravitational pull and enter orbit. And he was all about the launch into space thing!

"Barf," was his only comment.

Grace seemed to appreciate that, and mimed throwing up with a finger held to her pinched lips, her cheeks puffed out. Her eyes, however, smiled dazzlingly. "At least you've been in one before. And survived it."

"It really is awful. But also survivable. You'll be fine." He slugged her on the shoulder as if to say *cheer up*.

The sim's first two participants were shuttled in ahead of Davey and

Grace. Fully expecting to have to wait the forty-five minutes required for their slots to free up, Davey was surprised that the training tech returned almost immediately for them.

"While those guys are in the sims, why don't you two come with me? We're going to give you a spin," he said, seemingly enjoying the look of dread he had inspired on the kids' faces.

"Well..." Davey looked to Grace, "you up for this Gracey?"

She gave him a withering look.

Oh, groan... why did I have to call her Gracey? Why can't I learn to keep my big mouth shut? he silently berated himself. "I didn't mean anything by it! Honest! It just slipped out. I think of it as... as endearing." *Endearing?* Good God, what was the matter with him? His first proper one-on-one encounter with this girl and already he looked like a complete unit! He was sure he must have been sporting a full-body blush by now, which only added to his misery.

"Well *I* think of it as *annoying*," she shot back, though he was somewhat relieved to see that her smile said anything but.

The pair were led into the G-spin facility by one of the training coordinators, and left in the hands of the Droids. Davey had encountered these fantastic creatures, for lack of a better word, with much fascination during his first round of training. "The entire G-spin operation is run by humanoid robots," he told Grace.

"What? They're going to put us in a steel cage and spin the doo doo out of us, and you're telling me it's run by robots? Why did I not know about this before?"

"The system lends itself well to automation."

She frowned at him.

"I'm sure it's perfectly safe," he assured her.

The robots had humanesque facial features, albeit made of ceramic and other composite materials. Being human-looking was supposed to facilitate their interaction with humans.

The Droid smiled its tin can smile at the pair and greeted them with a cordial "Hello."

Davey smiled and said "Hello," but immediately felt he had crossed the line into some awkward place by having conversed with a robot. He and Grace shared a sidebar smile, and Grace turned her attention to the Droid, offering it an exaggerated "Hello," topped with a little curtsy. Davey couldn't help himself and snorted a little laugh of appreciation. But his jaw dropped when the Droid squared its shoulders and curtsied back. Grace giggled. Davey was struck with an idea. He dropped to his knees and offered the Droid a deep kowtow. When he arose, he and Grace laughed to see the Droid drop and mimic his bow.

Was it possible to be rude to a robot? He didn't know, but didn't

much care. Grace's smile told him all he needed to know.

Dressed now in their ridiculously clumsy and bulky g-suits, Davey's skate bag left behind in the change area, the pair sat side by side, leaving the two empty seats in their G-spin carriage vacant on either side of them. The g-suits were like personal airbags. At higher g they would inflate to restrict blood flow to the extremities, keeping it in the body's core where it was needed to support brain function.

Strapped in and cross-checked for safety by one another, Davey and Grace gave each other a high-five, and then Grace leaned forward to press the activation switch and signal to the control room that they were ready. The Droid appeared at the doorway of their compartment, smiling its incessant smile. Its laser eye scanned all the attachment points of their safety harnesses. Apparently satisfied, it wished them an enjoyable ride and shut the compartment's door.

"Enjoyable ride my arse," Grace said, and they both chuckled. But for Davey, the laughter was an escape from his anxiety. He remembered just how woozifying a ride this was. In particular, he vividly remembered the acceleration and slow-down phases that had left him disoriented with a nauseating, tumbling sensation. *Oh, please don't let me barf in front of Grace!* was his only wish as their capsule lurched into motion.

Davey had found that focusing his attentions on one spot on the console helped him to forget the motion part of the ride. But the effects of the motion, and that squishing feeling, were impossible to ignore. As they picked up spinning speed, he was amazed that Grace still had enough control over her face and mouth to make the hooting sound that emanated from beside him. But he couldn't turn his head to acknowledge her. And even if he could have, he was afraid that if he opened his mouth to express his own enjoyment of the ride that either a groan of misery or a blast of barf would emit instead.

He found himself looking at the control panel, willing the end of the ride. Davey knew from his interest in astrophysics, astronomy, and aerospace that the human body—the healthy human body with some practice at pulling g—could withstand only a few seconds at more than 10 g before passing out from lack of blood flow to the brain. Or, more precisely, the lack of oxygen to feed the brain that only blood flow could provide. The heart could only beat against so much pressure before it lost the battle. And he knew, then, that he and Grace, rookies in this spinning steel bucket business, couldn't hope to withstand more than about 5 or 6 g before they would both lose vision. G-LOC, or a total loss of consciousness, would soon follow.

The g-force indicator read +2.6... no, +2.7 now. Davey's g-suit had automatically begun inflating, and he could see by tilting his eyes to the outer boundaries of his peripheral vision that Grace's had also

deployed. That would help. Somewhat.

But the G-spin's control panel showed that they were still spinning faster and faster, creeping up up up. The display read 5.5... 6.5... *Shouldn't it be ending by now?* Davey was beginning to feel alarmed! Wasn't the Droid programmed to catch when something went wrong, and something was definitely wrong!

His vision, beginning in the periphery, grew dim and colorless. He knew that as the g forces increased, the blood flow in the back of his and Grace's eyes would be completely interrupted and they'd experience the temporary loss of vision, while still conscious—*black-out*.

Davey started to panic. There was the taste of tin in his mouth, a thick fuzzy tongue, a hollow echo in his ears. And then nothing.

Davey's vision pulls one of those fade in fade out kind of things. When his vision is on, he's woozy and can't make his mouth move to say the words that are spinning in his head. *What?... Where?...* Then he's gone again.

And as his consciousness returns once again he feels as though a giant stream of energy is pouring out the top of his head. And he's gone again.

He squints to restore his fuzzy vision into an actual image. He works to make sense of the view coming into focus directly in front of him. A puzzling upside-down view of Commander Gurov's concerned face. His senses register the feel of Gurov's hands, like bear paws, gripping him under the armpits as he drags him from the G-spin.

Grace! He suddenly remembers that she was with him, beside him. From where he is left lying on the floor, over his shoulder he can just make out the form of Gurov dragging Grace out of the capsule too.

He is gone again, but just for the briefest moment, he's pretty sure. And then, his mother, agitated and nearly frantic, is right beside him. He wonders again how long he's been out... wonders where he's been taken... he must send someone back for his skates...

Next to his mother stands Captain Creepy. He reads his name tag upside down: Kadmon. How long has he been out? And where have they taken him? But the sickly smile of the Droid he sees from his stretcher tells him he is still in the simulator training area.

11: OH, 2 B VIRTUALLY COOL

The future is already here. It's just not very evenly distributed.

William Gibson: (American / adopted Canadian) Science fiction writer and founder of cyberpunk

Nearing the end of their training program, Group Number Six sat in its assigned meeting space, the student lounge. They'd had a last minute addition to their agenda, with an alert coming over the INFOtron early this morning. From what they could tell, they were the only group who'd been asked to assemble.

From the student lounge, they would be shuttled to a training center attached to the technology wing of the Hartland compound.

The training centre was an area Davey knew well, of course, as it was home to the infamous D-wing that housed all of the simulator training: the G-spin and all of the flight training sims. And his buddies, the Droids.

As Davey got off the electric minivan that had shuttled them across from the main campus, he was seized by a moment of panic, and he had to stop to pull himself together.

Last week's G-spin incident had spun him out of orbit emotionally, and made him question himself. Was he really Hart's Halo material anyway? And it had run the risk of ruining him physically. But they'd looked at him through every type of medical scan known to man, and hadn't been able to explain the excruciating pain he'd felt in the top of his head after the G-spin accident. So once the pain had gone they had cleared him to fly. But it continued to haunt him: How had such an accident been allowed to happen?

And something else was bothering him too. He flashed back to the accident. His mother, and Gurov... how were they first to arrive at the G-spin? Except for that security dude... could he have called them? Had he and Grace been out that long? He needed to talk to his mother, but for the time being he shook it off and followed the group as they were led down the hallway by a white-coated training tech.

Inside the high-tech lab setting, the kids had automatically clustered into small groups. Davey sat chatting with Grace, Fabien and Bhu, who by now was less shy and at last accepting of the nickname the other kids had been unable to resist. Dr. Wainwright entered the

room.

“Well, you must be very fortunate young men and women,” he began, immediately winning Davey’s attention. “I expect you’ve been wondering why we brought you all the way out here? Perhaps I’ll just let Dr. Hart explain that to you himself,” he said, smiling broadly, as Hart wheeled through the doorway accompanied by a klatch of four attendants.

“Dr. Hart... how wonderful!” Viktor said cloyingly, addressing their host, though clearly more for the benefit of his peers’ impressions than anything else.

Hart offered a gentle nod to Viktor, and then shared the same courtesy with the other ten children assembled.

“There are some chairs set up in the back over there. Please, let’s go over and take a seat and we’ll get underway.”

Hart began by explaining that they had been assembled as a group in the earliest days of the pre-launch training not simply because they were roughly the same age, and not by any happenstance. In fact, he told the children, they had broken the Colony children out into these working groups because of the results of the extensive testing and analysis that each of them had undergone prior to the commencement of pre-launch. Not because they were all the same, either, he stressed, but also “because of your uniqueness; the attributes and skills you can each individually bring to what is an outstanding assemblage of young minds.”

Davey was enormously flattered, and caught a sideways glance from Grace that suggested that she thought this pretty interesting too.

Group Number Six had been singled out for a remarkable treat, he told them. Hart himself was going to take them on a virtual tour of the Halo!

But what Hart was offering was not just a two-dimensional view of the Halo (each of the kids was pretty familiar with the layout of the Halo), or even a three-dimensional view. He was going one better. Each of the children would join him in a virtual, computer-generated Halo for the kids to explore. This same virtual model was just about to be released to earthbound Halo aficionados in the form of a Live Action Role Play HOLOgame. Their group would be the first outside of the development team to see, and to try, the finished product!

They would each have to wear a set of goggles, at that moment being distributed to them by one of Hart’s aides. When they had these on, and were synced into their virtual reality space, each of them would appear to the others as a different glowing, floating icon in the virtual world they would be sharing.

The kids excitedly followed Hart’s instructions and fit their goggles with the assistance of a couple of Hart’s helpers, while Hart had help

putting on his own. Once the goggles were in place, Davey found he had completely lost his peripheral vision. All he could see was the blackness of the goggled world. Suddenly, that world came to life with a gentle, glowing light that felt to Davey what peace and serenity must look like. Just as quickly, all of the kids emerged in a brightly-lit but cavernous space, in the center of which, looming intimidatingly overhead, was one of the Halo's two RLVs (or a deadly-accurate image of it, Davey had to remind himself). They were standing in the HaloPort, where their arrival on the Halo would naturally begin. Davey was supremely conscious of being in the midst of a dozen or so colored, slowly blinking lights.

He then heard Hart's voice. Looking around, Davey could sense which of the lights belonged to Hart by the subtly quickened blink and slightly brighter light that accompanied his speaking. "Each of us is represented by one of these lights, girls and boys," Hart said. "If you are wondering which is you, it will become immediately clear to you when we take roll. Each of us has a unique color and blink pattern, and this will identify you by showing a subtle change to your light when you speak. So... if we can each say our names, let's do this alphabetically, if you please, so that we and our companions can establish which of us is which."

Davey noted that Grace was represented by the red light that beat with the thump-thump regularity of a pulse. His was golden, and had a slow-quick-quick Morse code kind of beat. As Hart began to move the group through virtual space, controlling the tour using the computer keypad mounted on his wheelchair, Davey somehow managed to position his light so that it hovered in the same vicinity as Grace's (though he had no idea how he'd willed it, or even if he had).

They had already seen much of the Halo—the command center, their school, the accommodations—when Hart asked if they would like to see the center of the Halo ring. The Gravity 0 Origin, more affectionately known as the g0o zone. The kids, of course, were unanimously enthusiastic.

Hart explained the importance of the g0o zone to him and people like him, with physical disabilities. Because this part of the Halo did not spin, it did not have the gravity-like environment that was to be found in the Halo's outer ring. So, to them, the g0o zone represented physical freedom.

Hart demonstrated how the g0o zone was accessed, with an overhead gateway that opened like a trapdoor. He explained that, on the Halo, they would have to wear a special belt that would attach them to a launch line that appeared through the trap door. The launch line would then pull them into the center of the Halo, two at a time, through a connecting, spinning arm that ran like an elevator to the

center of the space station.

“In our case, the trip from Halo to g0o has not been simulated,” he added, “but we can set the virtual tour programming to transport us there, kind of like Star Trek. Let’s beam up shall we?” he said, and proceeded to do so.

“Of course, being that this is only a virtual tour, you cannot fully appreciate the most wonderful part of the g0o zone. The zero gravity! So to make up for that, I’ll take you to the second most wonderful part!” He led them along a long corridor, to an area where the hallway walls turned to glass. They looked over a large, wide open space with markings on the walls and floor. *A court of some kind?* Davey wondered.

“This is where you will be able to come to play a game we’ve called *Lash*. It was created by some of my, shall we say *more youthful*, Space Fleet crew that were involved in the construction and assembly of the Halo in her final stages.” Hart pointed towards the very centre of the g0o zone, into a Plexiglas walled room that resembled, in some respects, a floating squash court. That is, except that this room had a couple of what had to be thought of as goal buckets. The buckets sat flush to an outside wall instead of hanging from it.

Hart explained that the game was played much like one-on-one basketball, except that the zero gravity environment added some new challenges and complications. In order to remain somewhat in place, each of the two players had to tether themselves by the ankle to a lash (hence the name of the game) that extended up from the floor of the walled room.

To help the kids get an understanding of how the game was played, Hart called up some 3D holographic footage and broadcast it like a hologram inside the virtual Lash court. It was video of some of the insane guys who came up here as astronauts and space engineers to build the Halo, and who slightly modified the plans for an interior terrarium to co-opt it into their sport court.

You could tell these guys had played once or twice before they’d filmed this footage. Opponents floated, facing one another, simultaneously defending their own goal behind them on the wall while rolling, ducking, and quite literally flying to attempt to deke out their opponent and land the ball in their basket. That the ball behaved erratically in this same environment, Davey noticed, was another consideration good players had to account for with skill. He loved it. Immediately.

After leaving the Lash court, they toured the perimeter of the g0o zone for a while. From there they would find their way back to the gateway that led to the Halo proper. Just as they were leaving, Davey

noticed a little training room off to the side. He called Grace back to take a look. It contained one of those bikes he'd seen astronauts use in space... the kind where they had to strap their feet to the peddles because of the zero-g. When they picked up their pace to catch up to the rest of the group, they must have taken a wrong turn, for they wound up at a dead-end hallway. The signage said this was a secure area and out of bounds to unauthorized access. Davey was not surprised when he turned to see Oliver Hart and the rest of the group at the top of the hallway. Hart called them over sharply, and then turned the group around and headed them back the other way to the Halo gateway.

Davey desperately wanted to ask Hart what that area contained, but knew it would be inappropriate to do so. Perhaps Grace, in her capacity as a Halo "insider," could answer his curiosity. He'd have to remember to ask her later. But it picked at him all the way back, from the virtual world into the real.

Hart brought them back, virtually at first, to the Haloport where they'd begun their private simulated tour. The kids were then instructed how to gently remove their headware. Although they removed their goggles to find themselves in the exact same real-world surroundings they had left, Davey felt confused and out of place. He found himself having to blink hard to accommodate the drastic change to the quality of light between the virtual and real worlds.

As the group, abuzz in conversation, was being reassembled to return to their study area, Davey was called aside by Dr. Hart. "Davey? I'd like just a moment, if I may," he said.

Lost for words, Davey turned toward the door and looked to Grace, silently beseeching her to stay by his side and help him through this moment. Meeting your hero is usually awkward at best. Having her there would serve as a buffer at least, hopefully reducing the likelihood that he would totally humiliate himself in front of, oh, probably the most important person in his life. Next to his mom, that is.

Grace raised her eyebrows and jutted her chin back toward where Hart sat. Her look said *Well... GO!* and she continued out of the room, following behind the rest of their group. Davey turned back to face Hart and was vaguely surprised to see that Hart's handlers had also slipped out, leaving him alone with the great man. He swallowed hard, and felt a nervous kind of sick in the pit of his stomach.

Making eye contact with Dr. Hart, he was surprised to find that the warmth of Hart's smile relaxed him completely. He knew the smile he offered in return was of the sickly variety, but at least he was starting to feel slightly less close to death-by-embarrassment than he had been

only seconds before.

Davey tentatively moved a few steps closer.

“I just want you to know I’ve been very impressed by you, Davey.”

Davey couldn’t believe his ears. “Thanks...err, thank you, sir. Very much... umm...”

“Nothing to thank me for, young man,” Hart said, his breath heavy in his chest. “You have a way about you I find very intriguing. Your supple mind. Your fantastically creative approach to puzzles, which I’m sure you know is a trait I greatly admire. You remind me very much of a young man I once knew.” He smiled broadly. “A young man with tremendous potential.”

Davey felt dizzy.

“What I want you to know, Davey, is that I think you have a very promising future. Lots to look forward to.”

“I... I hope so, sir. I mean, I hope I won’t let you down.”

“Oh no, Davey. Don’t you worry about me. Just don’t let *yourself* down, okay? Don’t ever let the self-doubt creep in. Rely on the trusted voices, and not those that can sabotage us. Don’t give them time or space. You have work to do, Davey. Important work.”

Davey really wasn’t at all sure what Hart was saying. Well, he understood about the doubts and fears that could undermine us all. He’d already met them, and not a few times. But he didn’t understand exactly, specifically, what Hart was telling him, if indeed there was anything more specific to it. So he just nodded dumbly.

“How old are you now, Davey?”

“Ummm, almost thirteen.”

“Yes. I was not much older, really, when all of this happened.” An awkward sweep of his arms took in his crippled half.

Davey felt queasy.

“And yet, look at what can be achieved? You know, Davey, there are many levels of human achievement. And also many levels to human suffering. One may question whether the immensity of the suffering we can be asked to endure isn’t beyond our capacity. Beyond what the frail human condition can bear. But we just need to look at the evidence of life on this planet—our planet—to see to what extent the human spirit can triumph through adversity.

“I am not a complete man,” Hart continued, sighing. “I have struggled and endured and compensated for the holes in my life. And I have earned great satisfaction from the accomplishments these struggles have engendered, don’t get me wrong. But still... I have never filled that hole in my life. Never felt whole or complete.”

The silence drifted between them, and Davey was surprised to find it didn’t feel uncomfortable at all. In the end, when at last he spoke, it wasn’t to fill an awkwardness, but because he was compelled to reflect

on Hart's words.

"I can't imagine the... the *spirit* it must have taken for you to triumph over your physical challenges." No, Davey didn't feel uncomfortable for drawing attention to Hart's affliction.

"We all have our challenges, Davey." His look, and his words, told Davey he somehow understood what his were. "But remember, it is through these crises, Davey, each of us unto our own, and by our response and reaction to them, that we distinguish ourselves as human beings."

Davey could only nod. He felt an inexplicable lump in his throat. On second thought, he knew just what to attribute that lump to.

Like, my father... Davey thought to himself.

"Now, here... take this." Hart said, wheeling around to a desktop behind him, picking something up, and turning back around in his chair, extending a parcel before him to Davey.

Davey didn't know what to say, so he just held out his hands and accepted the parcel. It was beautifully wrapped in luminous paper and bound with silver ribbon. He tucked it under one arm. A thank you came reflexively, but didn't help express his joy, confusion and gratitude at receiving a gift. And from Oliver Hart, no less! But he still didn't understand, why?

"Sir?" Davey said.

"I believe in you, Davey Randolph. That's why. But, more importantly, I want you to go on believing in yourself, okay?"

Davey was overwhelmed. He felt the sting of tears barely contained. "I... I don't know what to say. Thanks, Dr. Hart."

Hart held a hand out to Davey, and Davey extended his hand to take hold of Hart's. Hart patted Davey's hand between both of his. He just nodded and smiled, and then, with a jut of his chin to signal the door, he sent Davey on his way. As Davey walked toward the door, he heard a gentle "Goodbye, Davey" coming from Hart, in what sounded like the most tired voice he'd ever heard.

Davey did not catch up with his friends but instead went straight home, and straight to his room with his parcel. He sat it on the edge of his bed and looked at it for a while in wonder, anticipation and curiosity.

As Davey unwrapped the box and moved aside the packing material it contained, his first awareness was of a foot. A little metal foot. Then four of them. Davey excitedly removed his gift: A robot cat! Hart must somehow have learned that Davey had left a pet behind to join Zero Colony. But he expected he was only one of many. Had Hart offered the same kindness to all of them? Hart had made such a personal demonstration of this gift that Davey somehow doubted it.

Turning it over in his hands, more kindly now, he decided it was super cute. It had a really friendly expression. Davey looked inside the box and removed the instructions: *Care and Companionship of Chip Cats*. He browsed through a few pages excitedly, knowing he would read the contents in its entirety as soon as he had a stretch of time. But right now, he allowed his interest to focus on his new pet, examining the cat eagerly.

This thing was state-of-the-art in personal robotics. It had a button-sized turbine engine and a wireless power feed. The Chip Cat would have constant access to its power supply, and be able to access its own programming updates, some of which, Davey knew, fell into the category of rudimentary artificial intelligence. This Chip Cat could “study” its environment, and “learn” behaviors, much the same way a real cat could. He couldn’t wait to train it!

He turned the tag around on the cat’s collar. *LooAnne* it read.

“Well, hullo LooAnne!” he said enthusiastically. And he almost jumped out of his skin when the cat responded by cocking its head and meowing a greeting in return.

“Oh... oh, geez. Yes. Hello it is, then!” he said, smiling at his shiny new pet.

The next morning, Davey emerged into the residence hallway still energized and enlivened by his Halo tour with Oliver Hart the previous day. He began to trace his familiar route to the training facilities. There was a nearly palpable tension in the air as he skated the hallways, only two days away from the first launch. Now the entire Zero Colony seemed to be walking around all stressed out, just like his mother had been for months. Oh, yay.

No. Something had happened, Davey realized. Too many of the faces he passed looked confused, even upset.

Just then, he saw Grace coming out of her family’s accommodation. He quickly caught up the hundred or so yards, to tap her on the shoulder from behind.

When Grace turned to face him, and she too carried that same look of sorrow, he really knew something big was up. Her eyes were rimmed red and her composure was thin as a spider thread.

“What is it, Grace? What’s going on?”

But the simple act of telling was going to prove too great for Grace to bear. Immediately, her eyes filled with tears. Then tears began streaming down her face. And her mouth took on such a look of anguish, Davey knew she would not be able to shape it around words.

Davey shook his head, his concern mounting now to approximate alarm. *What had happened? Had something happened to the Halo? Were the launches being delayed?*

"It's so... so... terrible." She began to cry now in earnest. Great wracking sobs. But more than just sadness, Davey thought he sensed... what? Some kind of personal grief? As he tried to interpret her signals, Grace was struggling to regain her composure. She huffed a huge sigh... squared her shoulders... wiped her tears with the back of her sleeve.

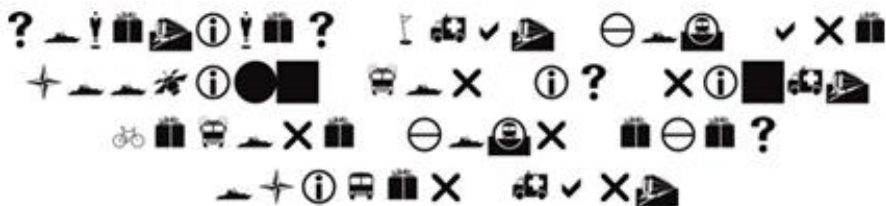
"It's Uncle Ollie," she said, a little more clearly now. She didn't have to say Dr. Hart. Tears streamed down her face again, but this time she pretended to ignore them. "He's *dead*, Davey!" Another deep, composing breath. "He died last night some time," she said, speaking deliberately and trying to remain self-possessed. "My dad... my dad is the Chief Flight Surgeon. He attended Uncle Ollie." She nodded, as though encouraging Davey to go on from there, to fill in some of the unmentionable blanks in his own mind.

"Oh..." he struggled. "Oh, Grace... oh no..."

"Oh, God, Davey it must have been so horrible for Daddy!" Her chest heaved in great, wracking sobs again as she gave over to the torrent.

Davey didn't know what to do. So he went to Grace and threw his arms around her. They were about the same size but his skates gave him a head taller. Feeling her shuddering cries stirred his confusion and anxiety, and he too began to cry, his tears dripping onto the top of Grace's head. Poor Dr. Hart. Poor, poor Dr. Hart. His lifelong dream, and he hadn't lived to see it realized. Only two days away from the scheduled blast off of the first RLV launch. *Or would there even be a launch now?* Davey wondered. Shame won in the scuffle of his emotions for even considering what Dr. Hart's death might mean to their plans for the Halo.

Later that morning, all of which had been spent in a funky haze, a routine pass at collecting his ePost brought Davey face to face with a message that read as follows:



Uncertain of just what it was he was looking at, he examined the ePost envelope. No sender specified, and both he and Grace listed as recipients. Davey was intrigued. He tried to raise Grace with an Instant Message, but was not surprised to find that she wasn't logged on. Instead, he quick-connected by VIDphone.

He wasn't sure what he might say to her parents, whom he had yet to meet, if they picked up the phone. Should he offer his condolences, knowing they had just lost such a close friend in Oliver Hart? He was relieved that Grace was the one to pick up.

Grace hadn't been into her ePost, she confessed. She'd been too miserable to move. So she logged into her ePost as Davey waited on the line. He worried, as he waited, that she seemed lethargic and disconnected. Of course he knew why, but found himself wishing he knew what he could do to help.

"What on Earth?" was Grace's reaction.

"What d'you figure?"

"Oh, jeez Davey... I don't know." She sounded exhausted, and Davey felt awful for imposing.

"I know this is hard to think about, Grace. But... it's a code, isn't it?"

"What are you suggesting? That this ePost is from Uncle Ollie?" She thought about it for a moment. "Truthfully, I guess I can't think of who else would be sending you and me a code, either. And who could be bothered to go to all the trouble of masking themselves as sender. That's not a simple trick, to do properly. And... yep. It's done properly."

"Don't you think we owe it to Hart... to your Uncle Ollie?" Davey asked. "I mean, what if he was sending us a message? You know... an important message or something?"

"Well... I guess. But I dunno. If it's in some kind of a code, how could anyone expect us to decode it without a cipher? Impossible," Grace said, frustration edging her tired voice.

"Well, if that's the case, and if this is all that was sent, maybe there is no cipher. So it's *not a code*," Davey explained.

"What do you mean, not a code? It obviously isn't the Roman alphabet, you dingbat..." Her tone was sharp and unforgiving.

"Oh, sorry Davey," she added, immediately remorseful. "I don't know what's the matter with me." He reassured her he understood. "I just meant, what else could it be if not a code?" Grace explained.

What else, indeed.

Davey found himself awake very early that next morning, the dark night still holding victory over the day. There had been a huge drop in barometric pressure, and a calmness had descended that bordered on alarming. As though the world maybe had stopped spinning.

Something happened to Davey in that quasi-sleep state, with his sensory receptors on standby, and his mind free to turn inward. A lot—no, most, really—of his best thinking "came to him" in these hypnagogic moments. His head would sometimes get so full of ideas

that he would have to run to the computer and dump them. Or grab a pad and draw whatever it was that filled his imagination. Sometimes he could then go back to sleep, but other times he would come back to bed though his head would just fill up again. He'd once told a teacher about this ritual, and Davey immediately knew that the teacher thought him truly bizarre.

Lying there in the sensory stillness of the late night, he had one of those lucid moments.

And thought it very likely he had just solved the puzzle of Hart's ePost.

He smiled to himself, but the satisfying sense of achievement immediately waned. In its ebb, he felt a profound and heart-wrenching loss. It was a feeling so overwhelming, it was as though he had stepped into it. So thoroughly had it overtaken his senses. It was a feeling he couldn't quite put a finger on, and had never ever been able to put a finger on in previous moments like these. And there had been a few. And yet, history had told him to trust these hunches that seemed to percolate up from his very being.

Trust it, he told himself.

Even though it gave him the sense that what he was feeling had something to do, not just with the death of Dr. Hart, but with the loss of his father? Because that seemed perfectly illogical to Davey. How could anything to do with Dr. Hart *possibly* have bearing on his father?

He breathed a long, fitful sigh, and then rolled over and willed himself, eventually, back into restless sleep.

12: CRASHING THRU SPACE IN A TIN CAN, ANYONE?

For here am I
sitting in a tin can
far above the world.
Planet Earth is blue
and there's nothing I can do

*David Bowie: (British) Über-artist
Space Oddity*

Davey awoke in his by-now-familiar, tingly state that morning at eight-thirty. He was still groggy from the disrupted sleep brought on by his middle-of-the-night epiphany. He needed to motivate himself to drag his weary bones from bed and face what this day might bring.

But first he needed to check something. And fulfill the hazy, dreamlike promise of the night before.

He dashed to the INFOtron and gave Grace a VIDphone call. “Genius, Grace,” he said, when she answered the phone.

“What?”

“Your dingbat comment...it sparked something.”

“Look: I said I was sorry. What? Now you want me to tell you you’re a *genius* and not a *dingbat*? Okay, you’re a genius. Happy now?” she said facetiously.

“No... not *dingbat*. Webding!” Davey explained. “Go pick up Hart’s ePost again.”

Grace did as told.

“Now, select the text...” he said. She swept her finger over the text to highlight it and knew to change the text font to Webdings.

“*Sometimes what you are looking for is right before your eyes. Oliver Hart,*” Grace read.

For a brief moment, Davey was so excited about sharing the solution, he forgot that he would never be able to share his excitement with Hart.

“What does it mean?” she asked.

“Beats me.”

“Or do you think it’s supposed to mean anything at all?”

He just shrugged. But, oh, it meant *something* to Davey all right. He

still wasn't sure what, though. And Hart, taking him aside after their virtual tour of the Halo; counseling him about living up to potential, challenges and perfection. About what it took to overcome adversity. He still didn't understand what that was about. But *something*.

Yeah. Definitely something.

The INFOtron had posted an emergency meeting for the entire Zero Colony, scheduled for the great auditorium at ten o'clock that morning. Commander Gurov was on stage, supported there by a few of the people Davey recognized as some of the key Halo Colonists. Dr. Dean, the chief flight surgeon and Grace's dad, was among them.

"First and foremost, my apologies for having to have kept you waiting, at all, for this meeting. But it was a great shock, and one that caught us completely off guard. Of course, by now everyone is aware of the tragedy that befell us only hours ago." *Now that's an understatement!* Davey thought silently. If the news coverage was any indication of these things, the whole *world* knew about Hart's passing by now. And the whole world, it seemed to him, would be nearly as crushed as he was. Nearly.

Davey had not heard their commander speak until this point. He was somewhat surprised to hear that Commander Gurov spoke in a clear, perfectly-enunciated British English. His voice held just a hint of the foreign-sounding tones Davey now knew to recognize as Eastern European or Slavic, and that Gurov's sons carried in their speech.

"Dr. Dean has been asked to provide you with an understanding of the events that led to Dr. Hart's passing. We think it important that each of you is kept abreast of the circumstances if you are to be able to understand and accept the choices we are going to have to make on your behalf. And on the mission's behalf.

"I will also offer you the opportunity to ask any questions you see fit or relevant. There are mics set up in the auditorium aisles, there and there," he pointed to the microphone stands. "Please feel free to use them."

Dr. Dean then took the podium. Davey found himself searching the audience for Grace, thinking she might be up front and perhaps visible from his vantage, but there were just too many heads. Over three thousand of them.

The doctor explained that, indeed, he had attended to Dr. Hart in the early morning hours the previous day. Dr. Hart had set off a health alert alarm that he wore at all times, but by the time he had arrived at Hart's quarters, only three minutes later, Dr. Hart was already dead, having suffered a massive heart attack. Efforts were, of course, made to resuscitate him, using a defibrillator and CPR. Dr. Dean was accompanied in these efforts by two other Halo medical personnel,

whom he had called to the scene as soon as he had established the gravity of the situation.

As Dr. Hart's chief physician and personal friend, Dr. Dean said that he had been intimately briefed with Dr. Hart's wishes with respect to the kinds of life-saving measures and heroics he would accept in the event of such a situation. Dr. Dean was the keeper of Hart's living will, as it were.

"Oliver Hart, while a vibrant and energetic man, lived in a body that had suffered the ravages of a lifetime of tetraplegia. His condition was an enormous strain on him physically, and he had been living with a multitude of health complications for many years now. Dr. Hart was nearly sixty years old. And he certainly understood that his life expectancy was not that of the average man. Perhaps, in many ways, this is one element of Dr. Hart that made him such a visionary and a stalwart pioneer. That he never felt the luxury of endless tomorrows that were his for the asking and, consequently, lived every day, and made every choice, bravely, as if he were on borrowed time."

Dr. Dean paused and looked over to Commander Gurov, as though asking him if there was anything else Gurov felt he should add.

Gurov turned his attention to the assembled Zero Colony. "Are there any questions about the circumstances surrounding Dr. Hart's death?" Davey could see a couple of hands in the air, and Gurov motioned them to the mics he'd referred to earlier.

The first person, someone Davey did not recognize, stepped up to the mic. "Errr... yes... I was just wondering if you have ruled out foul play, as it were? I mean, the timing is awfully coincidental with the Halo's launch. Had you considered that Dr. Hart's death could be a matter of sabotage to the Halo mission, or something?"

Davey felt sick just contemplating the notion.

Dr. Dean resumed his spot at the podium, and appeared to be taking a moment to frame his reply. "Yes. We did, out of necessity, have to consider every possibility. I have already run some toxicological analyses on Dr. Hart's remains to rule out the potential for foul play. And given that these tox panels were completely negative, and that Dr. Hart was locked safely inside his quarters at the time of the incident, I feel completely confident in my conviction that Dr. Hart's death was a result of natural causes."

The same man continued with part b of his question: "So... no autopsy has been performed?"

"No. It was contrary to Dr. Hart's wishes, and not medically necessary for me to establish with absolute certainty the cause of Dr. Hart's death. And I have both jurisdiction and authority from a medical perspective to support my assessment as being sufficient. His remains have already been cremated."

Davey looked over to his mother, who was wiping a tear from her eye. I guess it didn't matter how well you knew, or didn't know, someone. Death was sad. The end.

Commander Gurov returned to the podium mic. The other questioner had returned to his seat, presumably because his concerns had been answered by the first set of responses.

"True to fashion, to ensure that cooler heads prevail, Dr. Hart recorded, as I mentioned earlier, a living will. We'd like to air excerpts of that now—to you, first. The media will have a briefing in an hour, and then it will be released to the world."

The emotional disconnect of seeing Hart, disembodied, stripped of his human form, inhabiting flickers of light, was almost too much for Davey. He felt as though the scab had been picked off his grief. He flinchingly averted his eyes from the image of Dr. Hart and saw instead the mix of distress and despair that dressed the faces around the giant auditorium. He felt his breath catch in his chest, like one of those hiccups you can get when you're crying, only his eyes were itchy and dry. He felt as though something had sucked all the air out of the room.

Davey returned his attention to the big screen. "... so proud of what we have achieved together..." the talking head that was Dr. Hart was saying.

So what if his connection with Hart had been brief and by pure chance? As far as Davey was concerned, he and Hart had an emotional connection long before they were ever physically acquainted. Hart was his hero. Hart was his idol. He had been for longer than Davey could remember. Hart felt more like a father to him. And it agonized him to watch Hart talk about the mission they would now never share.

"I have given explicit instruction," Dr. Hart was saying, "to your mission leaders. Where issues relating to this mission are concerned, every possible scenario has been considered in advance. With every contingency examined, I can have the greatest possible assurance that this mission will go ahead, and that it will succeed, no matter what fate throws in our paths." Someone hit pause and the image went still and silent.

"So, as you can see, Dr. Hart's wishes were quite simple," Commander Gurov resumed. "We are GO."

Davey was both thrilled and terrified. His mother reached over and squeezed his knee.

"In keeping with his request, Dr. Hart's remains will be brought to Hart's Halo on the first launch, and dispersed into space from there. Launch One will proceed as scheduled tomorrow morning. And Launches Two through Eight will follow at intervals of two days

between launches, as stipulated in our Mission Plan. This project meant the world to Dr. Hart. Let it be clear to each and every one of you that he would want nothing... *nothing*... to interfere with its progress.”

Gurov’s voice grew a little louder as the hum of whispered reactions filled the giant auditorium. “You will find the passenger lists for each individual launch, separated into Crew Alpha and Crew Omega to reflect the delineation between the two RLVs we will be sending up for each launch, posted on the INFOtron when you return to your accommodations.” He looked over his shoulder to someone in the assembled group of key Halo personnel and received a nod from her. “These have now been uploaded, and you will be able to access the lists once we adjourn here,” he added.

“Ladies and gentlemen,” Gurov paused, waiting for the audience to resume calm and quiet. “Ladies and gentlemen? I want to *stress*... there was a great deal of careful consideration that went into establishing the launch lists. Our policy has always been that families will travel together—no exceptions. And, yes, we will be sending up a mix of personnel, with an obvious emphasis on the essential core team, in each of the launches. We do have to be prepared for any eventuality. While we have used the RLVs extensively in the construction of the Halo, we do know that they are not infallible and, indeed, we could be facing some delays in getting all eight launches off on schedule. While I hope and expect this will not be the case, we have had to account for the fact that the Halo may have to run on less than a full contingent of Colonists for some small period of time, if we do see any delays to our launch schedule for whatever reasons. If anyone has any concerns about their placement on the lists, I would like to have you address these directly to me within the hour. Is that clear?”

Clear as a bell, Davey thought. He knew he should have no expectations as to where he and his mom might sit on the launch list. In spite of whatever exercises they had done in pre-flight training, nobody was going to kid him that a botany assistant and her son—lottery winners to boot—had anything like a priority place on the Halo.

“Those of you who are on the list for Launch One will find you have a barrack box with uniforms and other essential kit arriving some time this morning. As you are well aware, you will not be required to wear your uniforms during your leisure hours on the Halo, just while at work or school. Of course, the launch suits you have been using these past months for training will now be put into service. Please do verify that the uniforms we have provided fit comfortably, and report any discrepancies to your handler here at Hartland by two P.M. today.”

And with that, the audience began to disperse, most people racing quite noticeably back to the residential areas to check their places on the launch list. On his way out of the auditorium, Davey paused for a moment to wait for his mother to catch up. Off to one side, he noticed one of the commander's boys chatting with a girl he'd seen around but whose name he didn't know. She was blonde and quite pretty, and by the look of the Gurov boy, he was working hard to impress her. As the crowd thinned a bit, he was able to overhear some of their conversation. At first, he thought they were talking about his G-spin incident, something about the training facilities, and so he listened more intently. But instead of hearing third-hand news of his and Grace's infamous spin, he thought he heard the young Gurov mentioning a break-in at the training facilities. And that this too could have scuttled plans for Launch One. But Viktor's dad was... what? He'd missed that. His dad was *what*? A break-in? *Was that why the access hall where the G-spin was located had been cordoned off?* he wondered. He casually moved half a step closer and strained to hear more.

Just then, his mother linked her arm in his and began to walk away with him. "Look who I found?" his mother said, as Grace walked towards them.

"Hey... I looked for you this morning. How've you been?" Davey asked Grace.

"I wondered if you were going to be here," his mother chimed in. "Figured you knew enough of the details to not have to come to the briefing. I'm really sorry for your loss, honey."

"Thanks. I'm fine really. A lot better," she added specifically to Davey.

Davey and Grace told his mother they'd see her later, and hung back a bit to go get a drink from the square. Davey was in no rush to see the launch list, certain he would not be leaving for days yet. And he was pretty certain his opportunities for time with Grace would be limited this next little while, as she was sure to be on the first launch out of here.

"Davey. Just the man I was looking for," Commander Gurov began when Davey walked through the door into his own living room. "Listen, young man... I suspect you have had a look at the launch list by now?"

"No... no, sir," Davey stammered, completely taken off guard to find the commander standing there. "I was... ummm... going to take a look later. I was busy. I mean, I was out."

"Quite. Well, perhaps you may have some question as to why you are launching tomorrow?" Gurov, who obviously viewed the question

as rhetorical, began his explanation without a response from Davey. “I don’t need to tell you how important Dr. Hart felt it was to bring the world’s imagination along with us to the Halo? And that you... your mother... the other successful lottery winners, all represent something magical—something bravely conceivable—to the public at large. You represent the accessibility of space travel. And the reality that space can belong to every man.”

“I see,” was all the response Davey could think to contribute when Gurov paused, he presumed, looking for some kind of feedback from him.

“Yes. Now, when we compiled our list for Launch One, there was one spot left when we had filled the two RLVs with key personnel, plus their families. The spot, of course, that had belonged to Dr. Hart himself. It shouldn’t surprise you that the lottery was exceedingly important to Dr. Hart. He made a specific request in his will, that his place go to a lottery winner.”

Davey couldn’t believe what he was hearing. He was going up to the Halo first? Tomorrow? And alone? Hadn’t Gurov just said that families were to travel together, with no exceptions?

“The world will be celebrating the arrival of our planet’s first space Colonists. Hart felt that the only person who could bring the hearts and minds and imaginations of the world with them into outer space anywhere near as well as he could himself, would be a lottery winner. One of them, that is. You and your mother? You are the smallest family from the lottery Colonists. We decided that sending you would be the more symbolic, in a lot of ways, and therefore the preferable option.”

Davey was stunned. He didn’t know what to say. “Sure,” he offered, weakly.

“It’s only for a few days, until your mother arrives on a later shuttle, of course. I think we can make a one time exception to the family rule, in this instance. You are after all, one of our older kids.”

Davey wondered who else would be on the Halo with him those few glorious days?

“To be on the safe side, we’ll make Mr. Andersson your guardian. He’s scheduled for Omega too, and will be your buddy for the few days ’til your mom joins you.”

“Why don’t you get your gear together, honey? I’ll see the commander out, and we’ll get you organized. This is so exciting!”

Davey pulled up the passenger list on the INFOtron’s transparent, ghostly screen and began searching for his and his mother’s place on the launch schedule. Had the last few moments not taken place, he would have begun his launch list search from the bottom up.

But there it was: his name on the list for Launch One, Omega Shuttle. Seeing it in writing made it another one of those remember-it-forever kind of moments. He was confused by the events of the last day. Even more confused by the idea that he'd basically been chosen to fill what would have been Hart's seat. But that did nothing to suppress the giddy feeling he had. Like, he wanted to do cartwheels. He was going! On a rocket ship! To live a five-year stint on a space station! A shudder of fear hit him at the thought of riding that rocket alone. Davey traced his finger along the launch list, now, to see who he'd be sharing this adventure with.

Davey was happy to see that Grace and her ultra-important family, not surprisingly, were also scheduled for Launch One. Even though they had been assigned to a different shuttle—Alpha, piloted by Commander Gurov—he immediately felt less alone.

Davey's ship, the Omega, would transport, among its two hundred passengers, Colonists who were mostly strangers to him. With the exception, that is, of Omega's pilot, his beloved Major Kissmann, whom he was happy to see had been given the yoke. And Davey was overjoyed that he had been assigned a seat on the first level of the RLV passenger cabin, just below the cockpit. The RLV, shaped like a bulbous rocket, had three levels of passenger seating, stacked one on top of the other, in which the seats circled the centre of the ship in two rows. He knew that from where he would be seated, in the inner row on the top level, he'd have at least a peek a boo view of the activities in the cockpit above. This, of course, thrilled him to no end.

He looked over the seating chart again, recognizing some of the other Omega passengers, not so much by name but by the importance of their positions: Chief Communications Engineer, Chief Space Elevator Construction Engineer, et cetera. But with the notable exception of Bhuvana Verma, whose mother was in charge of maintaining the Halo's biosphere, none of his friends were scheduled to ride on Omega. Davey wondered whether it was a coincidence that so many of the kids from his training group were among these priority travelers. Perhaps, because they were the offspring of some of the Halo's most essential Colony members, it should come as no surprise that these kids were no slouches themselves, and had demonstrated some special aptitude Hart had recognized and encouraged. Either way, many of them would be among the first to travel with him.

The ringing of the VIDphone preempted any further consideration of the matter. He grabbed the call from where he sat, routed through the INFOtron screen.

It was Grace, looking much better than she had even just moments ago. He fidgeted when he saw the picture-in-picture of his own image, being picked up by a living room camera and beamed back to her.

“Hey... how’ve you been?”

“I’m a lot better, thanks. My mom and dad and I had a big talk. And Dad showed me all of Uncle Ollie’s living will movie. It was really nice. And he seemed really at ease with... I don’t know... with dying, I guess.” She stopped to ponder her words. “It was really inspiring, I guess is what I’m trying to say. Anyway, how are you? Have you seen the launch list?”

“Ummm, yeah. It’s for real! You’ll never believe who was here with my mom when I got home?” He didn’t wait for her reply. “Gurov!”

“Yeah? To talk to you about it?”

“Yep. I was kinda surprised my mom was so on-side. I mean, letting me go up on my own! But... hey!”

“That’s awesome. We get to get ready together! So, have you seen your barrack boxes yet?”

“Nope.” Davey had forgotten that all those scheduled for Launch One were going to receive a delivery of their barrack boxes. He hadn’t paid that much attention to those details, not imagining he might be among those receiving theirs today. “I gotta check it before two o’clock or something?”

“Don’t worry. It’ll all be in there and fit like a glove, are you kidding? These guys are like a machine. They *never* miss a trick. You’ll see what I mean when you go look. They’re probably outside. Move me back to the VIDphone by your front door and go look.”

Sure enough, the boxes had been dropped just outside the front door. On top of the two sturdy kit boxes lay a Halo toy in its packaging. *Neat*, thought Davey, picking it up for a look. And then his jaw fell, and he went limp and dropped the package. His mother had seen him going to the door, and was behind him now. She picked up the box. “Oh, my God” was her stunned reply.

“Isn’t it boost?” Grace asked, laughing, from the VIDphone’s video monitor just inside the door. “We have our own character toys! Can you believe it! There’s you... and me...” *complete with the colored swatch of hair?* Davey wondered. “And the Gurov boys come in a *set of three*. Oh, my *God*, that is so going to fry their butts! And of course, the commander... and Uncle Ollie,” she added the last with a sigh. “Go to the OMNIsite and check it out!”

Grace also told Davey about the launch parade that next morning. Apparently there would be OMNIvision crews from all the big stations, and the presidents and prime ministers of the twelve world states who had their nationals represented among the Zero Colonists. “You better check it out. There’s a bunch of stuff we’re going to have to do, like pose with our toy likenesses and stuff. And they are putting together some crummy vlog, where we have to post PEEPs for kids back on Earth to subscribe to. *Teen Halo*, or some stupid thing, it’s called,” she

lamented. “Like I want a bunch of strangers looking at me? Yeah, right.”

Part of Davey’s lottery contract already had him doing some of that kind of promotion stuff with Halo fans during his stay at Space Camp. In fact, he’d posted his third vlog post called “Five Minutes” just two days earlier. And he was already well acquainted with the squirm-inducing production of putting the short, random, on-the-go video PEEPs together in order that people he didn’t even know could gawp at him.

At first, he had to admit, the attention (they wrote to him in droves!) had been kind of nice. And he had started out trying in earnest to answer all of the fan mail he had received. His “lucky lottery boy” status had been heavily promoted, especially to the wannabes who themselves had hung a dream on the Halo lottery. So he had tried to go along enthusiastically. But sheer volume had required that he give up on it, and he was now sending a *Thanks for Writing* autoreply instead, referring them to the latest PEEP update on his vlog as a way of staying in touch.

“Um... I never told you... don’t be mad okay? I just was so embarrassed I didn’t want you guys to find them and blast me. ’Cause it wasn’t fair I was the only one who had to do them...”

“What? You have a vlog and you haven’t told me? Davey!”

Davey looked sheepish. “What!? I was embarrassed.”

“No, it makes perfect sense. I should have figured as much, right? HART Corporation the ultra-slick, well-oiled marketing machine that they are. Where is it...” He could tell by the way her voice trailed off that she was already on her ONE looking for it. “Oh... there you are! Don’t you look all fresh faced and clean cut,” she teased.

“Grace—” Davey objected weakly.

“I gotta go. I’m going to go take some vlog tutorial from this site I just found. Byeee!”

“Bye,” he grudgingly replied, probably after their connection had already terminated.

13: CATCH YOU ON THE FLIP SIDE

A hero is no braver than an ordinary man, but he is brave five minutes longer.

Ralph Waldo Emerson: (American) Essayist and poet at the centre of the American transcendental movement

VLOG Archive: Davey Randolph

Title: Five Minutes

Posted: 09 20 2033 / 16:15 EST

So hey... this is Davey Randolph... but I umm I guess you already know that. And this is my vlog. If you're just finding me today, this is my third post. So, umm... have a look in the archives, maybe, and start this journey with me from the beginning?

I just wanna say thanks for all your messages and ePosts and stuff I really appreciate it. We really appreciate it. Us kids. That are going up to the Halo. You'll be meeting a bunch of them soon enough.

It's cool to, you know, to be able to do this with all you guys along for the ride with us. It's going to be so boost... and, ummm... I read this quote the other day? By a guy named Ralph Waldo Emerson... and I thought about sharing it with you guys. Okay, I hope I don't mess this up, but... it goes: A hero is no braver than an ordinary man, but he is brave five minutes longer. That's so how I feel! I mean... no... not like a hero... 'cause you guys know I'm just an ordinary kid like you. I got chosen to be here totally by chance, right? But that idea? That anyone can be a hero? They just have to stick it out, like maybe just five minutes longer than anyone else would have, you know? I like that. And I'm thinking those five minutes are going to be when they strap me into that RLV seat! (laughing) What do you think?

Yeah so anyway... I'm going to do one of these every few days from here on in, now we're so close to launch. And I promise I'll get away from vlogging from my desk and do some PEEPs for you from around Hartland next. I hope I'll answer a bunch of your questions about what life's like here in Hartland and on Hart's Halo. We're nearly ready to go! I know, I can hardly believe it myself. So, anyway... Later.

“Davey?” his mother said, as she entered their compact living room. “Hon... I’ve been thinking. I, uhhh... I have something I’d like for you to have.” She took a seat at the opposite end of the sofa from him. He laid his training information open on the table and turned slightly to face her.

“I’ve been saving these for your thirteenth birthday, and, well, here it is... tomorrow,” she began, her voice tremulous. She sat down on the couch beside him.

“Mom? It’s okay,” Davey said, not knowing what was okay, but just wanting to reassure her somehow.

Davey's mother held out her hand, and within it she held two e-clips. These handy e-clips had at one time, about ten years earlier, been the absolute must-have in portable personal data storage. It was not as though that much had changed in personal data storage for decades. Once the world had at last given up on those easily trashed, scratched or damaged data storage media like DVD and CD and adopted solid state USB flashdisk storage, new developments in mainstream physical storage media had slowed. Growth in bandwidth and the endless storage, ease of access, and transfer flexibility inherent in the OMNI—the ubiquitous satellite-fed nexus of everything digital, and heir to what had started four decades earlier as the Internet—had made physical data storage an afterthought. Why worry about storing locally, when remote data was so instantly and wirelessly accessible from the digitized electromagnetic nebula that enshrouded the Earth's atmosphere? Everything that could, lived in the cloud.

Much like an updated version of the flashdisk storage devices that had been around since Davey's mom was a kid, these e-clips looked and behaved a bit like a mountain climbing carabiner—handy because you could hook it onto any loop or backpack or whatever. They were shaped like a small letter “e”, and where the tail of the e came around, it extended past the carabiner clip and provided the source to plug into the data device.

“But they're not a birthday present. Not from me that is. Your father left these for you, Davey. Along with this...” Davey immediately recognized the HOLOphoto she handed him as the one she had been keeping in her bedside table. The same one he had swiped to have his own copy made, and then replaced. He accepted it, feeling sick with guilt. “He gave them to me for safekeeping until now, now that you are thirteen,” she added somberly.

His dad? “He told you that? He gave these to you for me?” This was huge: the first acknowledgement Davey could even remember his mother *ever* making that Davey so much as *had* a father. Almost everything he had learned about his father he had conned or coerced over time out of Grandpa Jim, whom Davey knew only complied to the limited extent that he did because he felt sorry for Davey. His mother wouldn't talk about his father, ever.

To this day, the photo was Davey's sole connection to his dad. A father he hadn't seen since the age of three.

He had long ago given up asking his mother questions about his father. In the vacuum of silence, in early years, he had variously dreamed his father's absence as being the result of grand circumstance. Like, say, a tragic space accident so horrible his mother couldn't bare to speak of it. Or, maybe, a highly classified and sensitive foreign spy mission. Gosh, maybe even deep cover secret

service work that held the fate of the nation in the balance.

But as he'd grown older, he'd come to accept that his missing father's disappearance probably hinged on something singularly less thrilling. More like, say, an incurable boredom with family life.

Still, he just could *not* bring himself to believe his father was a total and complete crumb. If his father had somehow felt the need to make a new life for himself, Davey could not believe that he would be able to do so without any communication at all, for almost ten years, with his family.

This left Davey with only one ultimate conclusion that satisfied him on all counts: His father must be dead.

Davey felt his body tingle. Felt a rush of love for his father. In a flood of recollection, he was back in that dream. The one he'd had their last night at Grandma and Grandpa's before leaving for Hartland. He remembered all the W's. The penetrating feeling that everything was a question that could not be brought to words. And the love he'd felt for his dad.

He looked at the e-clips. "What are they?"

"I don't know what's on them. Frankly, I've never bothered to think about it. Here." She extended her hand to Davey and he took the e-clips from her grasp.

"How did you know to give them to me? To give them to me now?"

"He left his journal for me. His gobbledy gook journal of scribbles," she smiled. "And he left the e-clips for you."

"Was there... like... any note, or anything?"

She struggled with her next words. "No, doll. There was no note. They were in your bed, okay, on a pillow at the foot of your bed. In an envelope with tomorrow's date on it. Which I took to mean that I was to give them to you tomorrow, on your thirteenth birthday. But with your launch being tomorrow I thought best to give them to you now. And the journal was on our bed. On his pillow." Breath caught in her chest and she waved her hand and fanned herself to calm the tears that were starting to well.

"I'm so sorry, Mom."

"No, I'm sorry. Sorry I never talked about him. That wasn't fair to you." She hushed him when he was about to interrupt. "No. No, it wasn't fair. I really just never knew what to tell you..."

"It's okay, Mom. I know it was probably hard to explain."

"Davey, you have to think about who I was back then. I mean, you were only just three when your dad... when your dad left. I don't think either of us, you or me, had slept much at all in those previous three years," she said, rubbing his head. He shrugged, sheepishly. He'd heard stories his whole life about what an awful wakeful baby he had been.

“When your dad disappeared, it took me a long time to even be able to believe it. I don’t think I handled it all very well. And I know I made some unfair choices, keeping everything from you.”

Davey decided it was time to risk giving it voice. “He’s not dead?”

“Honestly, Davey, I don’t know. But I don’t believe so.”

“Then.... why...?” Davey’s voice trailed off.

“Why has he never tried to contact you? If he’s not dead? And where is he? Davey, here’s what I know. I was taught if you couldn’t say something nice about someone that you shouldn’t say anything at all. And there was a lot of nice I could have said about your dad until the day he disappeared. I could never make excuses for him Davey. I couldn’t just say *‘your dad couldn’t have done these horrible things they are saying he did, and then run off on us’* without being able to offer you an explanation. Or some kind of proof. In my heart of hearts I couldn’t fit what people were saying to me with what I knew of your dad. But how could I explain that to a three year old? Instead, I said nothing at all.”

“Maybe he was just done being in our family?”

“Are you kidding me, son? That man was more proud of you than I can say. You were his little chip off the old block. You were a surprise for us Davey, we weren’t really ready to have kids when you decided to come along,” she smiled. “But as soon as you arrived we knew we’d always belonged together. You have to know this Davey, I’ve told you this much before: It had nothing to do with you. Your dad loved you, of that I’m absolutely sure. And that’s the part that never sat right with me. Oh Davey, if you knew your father you’d know. He just wasn’t that man they were describing. He was... well... he was a lot like you are. Just a really good guy. Left his crap lying around sometimes too,” she smiled at her son. “But he was a really good guy. And I wanted to prove that to you one day.”

“So... what did you think happened to him? What were they saying had happened?”

“I had no idea what really happened. But they were saying he’d stolen some technology, and taken off with a bunch of money.”

“From who?”

“That’s just the thing, Davey. They were all hush-hush about it and wouldn’t say. And I’m kind of embarrassed to say this right now,” she smiled at him. “I was so young Davey. Just barely twenty. When your dad and I met... oh, this is going to sound so silly... but, for the longest time I didn’t really know what he did for a living! I guess I still don’t, really. I was young. We were in love and having fun. And I would have done anything for him, right down to getting those stupid matching tattoos.”

Davey knew by the way she’d always treated that “stupid tattoo”

that she wished she'd never inked it into her skin. He'd always known she hated it—was embarrassed by it—by the way she reacted whenever it peeked out from below an untucked shirt. He'd always figured that his mother would have had it removed had they been able to afford the procedure.

But he'd always been fascinated by it. Loved to gaze at its intricate design of rings, circles within circles. And he'd memorized the message inscribed beneath the pattern: *"goddess hides the message, the warrior protects his king, both drawn to the one hailed true."* But he'd never known that it was a matching tattoo to one his dad wore. Of course, she'd never told him that.

His mother continued. "He pretty much worked out of the library on the university campus. He had this math website. The Grey Matter or something. And it had enough members or subscribers or whatever it is to pay him a comfortable living. Never extravagant, but we lived off of that just fine so I never had to spend any of what I made. Which turned out to be a good thing. It got us through those first few months. After he was gone."

Davey picked up the HOLOphoto, wishing he could read behind his dad's smiling eyes.

"So, anyway... when he left I didn't know where to start trying to figure out what was going on. I realized I didn't really know that much about him. You know, other than who he was with me... with us." She smiled at Davey and patted his knee. "We didn't have family living anywhere near us. Other than logging hours at work looking forward to spending time with you guys, I didn't know anything else. And I'm sorry if you think it's weird but I didn't ask about his life outside our home. So other than knowing that he spent most of his days at the university library, or at least he had been when we met, I didn't involve myself in that side of his life."

Davey could tell she felt a little stupid telling him she cared so little to know about the professional side of her husband's life. "Then, the day after your dad's disappearance, these investigators came calling asking unbelievable questions! It never added up, Davey. I felt like there must have been a whole part of him I didn't know at all for him to have been hiding a plan like what they were telling me.

"And you know what, honey? I didn't want you to believe these stories about your dad. But I couldn't prove that the worst hadn't happened, with the little information I had. I felt I owed it to you to clear up your dad's name but I needed proof. And if I couldn't say anything good about him I wasn't going to say anything at all. And have you growing up thinking you were named after some heel. He was a good guy, Davey. He had some trouble at school, I know, but I think it's because he wasn't like everyone else. He didn't fit in so

easily. But anyway, left alone in the corner of the school library he obviously had his head full of theorems and formulas and stuff. No wonder he left school early, he was probably bored to death.”

“Who said he stole money?”

She looked at Davey with heaviness in her heart. “That’s just it, Davey. It was HART Corporation.”

“What?” Davey was stunned. “But... how? You’re saying that Dad was associated with HART Corporation?”

“Your dad may have had some pretty deep association with HART Corporation that he hadn’t told me about. I mean, in his defense, I never really pressed him to know more about his work. He wasn’t allowed. None of them were. Like Nick said, if he could have, Hart would have locked your dad’s brain up every night and sent him home with an empty head.”

“Nick?”

“Your dad’s old friend. The only one he ever spoke to me about. They had met in the library. They had so much in common. He only brought Nick home a couple of times, but he and your dad must have spent hours spinning their theories together over tea. When they were together you could see that they almost spoke their own language. I searched for him for years, but knew nothing about him, so you can imagine...” She shrugged her shoulders. “I finally found him not that long ago.”

“And Nick told you it was HART Corporation that dad was running from?”

“That’s right. And then, just days before the lottery, I met someone else. Look... Davey... it’s all a long and complicated story and I’m not even sure I understand much of it myself just yet. But I can’t stay silent any longer, can I? You’re a grown man now. You need to know the truth. Or, at least, as much of it as I can give you.”

Davey’s mind was working a mile a minute, and some very scary thoughts were flying around in his head. “So... the lottery. That’s why you wouldn’t let me enter.”

She nodded somberly. “HART Corporation had stolen my husband and my life. I couldn’t bear to lose you to them too—you, with all your ambitions of space flight.”

“But, do you think we didn’t actually win? That they chose us to be here, all along? Because of Dad?” He felt like such an outsider already as a lottery winner, now to learn he hadn’t even earned that? That he’d been put here. For what, he couldn’t imagine. “Why?” he asked.

He was replaying every element of this in his mind. “If the lottery wasn’t real, nothing else was real?” he asked in confusion.

“No, Davey, you can’t say that. But if we can’t say something good about why HART chose you to be here, we’re not going to say

anything at all. Until we know what's going on here. But I need you to just stay with it, and we'll keep figuring this out together from now on. You and me."

"But, nothing was real, Mom! Not even that puzzle I solved? The one in the velvet bag?"

"Now, you said so yourself: You solved it! And I do believe it was a test of some sort, Davey. You earned this, Davey. Don't you ever let yourself think otherwise. That puzzle? That was damned hard! Not for you, though. You make it look easy. You're so smart honey, just like your daddy. You get all of that from him, that's for sure." She reached over and hugged her son.

"Those puzzle books?" he asked suddenly.

"Yeah. I wondered when you'd clue in to that one. It took me a couple of years to get curious about where they were showing up from. Even began stalking the Christmas tree. But that darned puzzle book... Santa always got one under our tree, or under your grandparents' tree, even. By hook or by crook! It was the wildest thing."

She hugged him again. And moved in closer so they were shoulder to shoulder and hip to hip on the couch, her with her arm around his shoulder. She squeezed his shoulder a couple of times, reassuringly. "It's going to be great. You'll see. It's going to be just fine. We'll figure this out together. See... we have an advantage! We know more than they think we know! We know they want us to be here for some reason. Now we just have to figure out why. And everything is going to be just fine. When I catch you on the flipside."

Davey sat hunched over his desktop. A flurry of fingers sailed over the keyboard.

A heavy sigh.

"What the...? Why? I don't get it!"

Another flurry of flying fingers.

"Arrrrgh! Oh, come ooon? Really?"

Davey wasn't used to being denied access. But this was like nothing he'd ever seen before. The file wasn't so much a file as an electronic vessel that held the real file. Nearest thing he could think of to liken it to was this online game he played from time to time. Only in the game's virtual reality, your play earned you both the crypt—the electronic vessel—and the code to decrypt it. Here you couldn't even tell what you were playing with... much less was anyone going to drop out of the aether with a way to decode this thing that wasn't a thing but held the thing. The thing that was driving him crazy to get to. The thing that his dad thought enough of to put on a stick and leave for him.

No. He wasn't going to go there. He wasn't going to guess about, or dream about, or wish for, what was on these e-clips. He was just going to figure it out, is what he was going to do.

14: BEAUTIFUL DAY

See the world in green and blue
See China right in front of you
See the canyons broken by cloud
See the tuna fleets clearing the sea out
See the Bedouin fires at night
See the oil fields at first light
And see the bird with a leaf in her mouth
After the flood all the colors came out

*U2: (Irish) Bringers of rainbows
Beautiful Day*

VLOG Archive: Davey Randolph shared a post with Grace Dean

Title: T-minus OMG

Posted: 09 23 2033 / 05:45 PST

(wobbly camera) Okay, sooo... (Grace laughing in the background, the camera adjusts to take in both Davey and Grace's smiling faces. Dressed in identical uniforms they fill the screen with their ebullience and laughter)... I guess you already know that I'm Davey and this is Grace. And this is our first PEEP together. Yeah, but get used to it, people. Coz we're on our way up to the Halo in, like... three hours! Want to come!? For sure, we promise we'll tell you aaalll about it, okay? Wish us luuuck! Byeee! (waves and giggles)

The preparations of the last twenty-four hours felt like a blur to Davey. And all the hours and hours of pre-launch training geared toward this moment, including simulations in a highly realistic RLV mock up, could not have prepared him for today. He walked ahead a few steps in single file, and was at last on the gangway of Omega.

His rocket ship.

The actual RLV was much colder than he had expected. Or, at least, Davey felt a chill shudder through him as he walked the last few steps of gangway and into the inner deck of the RLV itself. He knew exactly where his seat was, and he found it without the assistance of the staff there to help passengers get settled.

Davey plugged his suit into ventilation, and paid more attention than he had thought possible to the by-now familiar routine of inspecting his own safety equipment, oxygen supply, harness gear, et cetera. As he finished his routine, he looked up to see Major Kissmann standing on the cockpit's tiny ledge, looking down into the passenger compartment. Kissmann caught Davey's eye, winked at him with a beaming smile, and turned to return into the cockpit's seating area. Davey sat back in his seat and tried to relax a bit but felt, at that

moment, completely detached from his body. He was floating on a cloud of joy.

Everything was a flurry of efficiency, timed to the last minute. He watched as the launch support staff finished their checklists and prepared to disembark. The last of them left with a dramatic wave and a bow, which elicited a chuckle from most of the passengers. The chuckles died down pretty quickly, however, when drowned out by the whoosh clunk of the air lock that had sealed them inside their space ship.

Davey's stomach went whoosh clunk too.

They had finished the pre-launch sequence by ten minutes before the appointed launch time. The voice of Major Kissmann's second in command, a former Royal Australian Air Force pilot named Warthog, came over the radio. He announced that they had cleared all of Mission Command's pre-launch checks, as had Alpha shuttle, and were now awaiting the final call to proceed to countdown.

The tension in the air—the excitement and the nervous energy—was nearly crushing, as the two hundred passengers braced themselves for the ride of their lives. Muted radio conversations could be heard from the flight deck, but everywhere else on Omega the stillness was creepy. Not a cleared throat, not a shuffled boot. All two hundred remained as still and silent as possible, straining for any hint that what they'd been practicing for for many months was about to begin. And then a small child began to cry.

When the final seconds of the countdown began, Davey felt as though truly in a dream. He wanted to pinch himself, to ensure that he soak up every sight, sound, and sensation of this incredible moment. The smell of rocket fuel, the way his eyeballs jiggled with the sheer energy rumbling beneath him, all were intoxicating. But he was too confined by his attire, too constricted by the security of his harnessing, too confused by how he came to find himself in this moment. He felt lost and other-worldly.

Davey could see how much effort the ever-thorough Halo training staff had put into painstakingly recreating this launch moment in their simulator. From the sim's pretend surging shudder of the rocket propulsion to its imitation of the receding world digitally displayed in their portholes. And in particular the piped in smells that made such a special effort to replicate the inimitable recipe of rocket fuel, treated air and nervous sweat. But in no way did the simulator prepare Davey for the real thing.

The shudder felt, not bone-deep, but DNA-deep. The roar, loud and full enough to thoroughly drown out any other sound, surprised Davey by becoming as imperceptible as white noise. And then came the

overwhelming sensation of movement. Like the crazy shudder had somehow wiggled them free from whatever had been holding them earthbound. It was a feeling he could not make much sense of, because it felt so unlike anything his senses had ever experienced. And if felt like nothing he could have ever expected. And yet his every cell, and even his every atom, gave him the assurance—this was right where he was meant to be.

He felt like hooting. Hollering. Like you would on the most fantastic and fearsome roller coaster. Only this was so, so much more. The intensity—the insistence—of this moment would live in Davey's heart forever.

Right here, right now, there was no past or future. There was only this moment. And it was perfect, just as it was.

In this other-worldly state of amped-up awareness, every heartbeat rattled in his chest. Once he'd settled into the mind bending knowledge that, wow! he was really in a rocket, blasting off from Earth, he began to live the experience in real-time again.

As he soaked up every moment of the experience, the aficionado in him began to leap ahead to anticipate the phases and stages of his space flight experience. There would be three stages of rocket to achieve orbit with the heavy payload they were carrying. What was that he was hearing? Must be the small explosive charge that would signal the jettison of the burned-out first stage. He felt some comfort in this, knowing that they'd cleared Earth's atmosphere and were moving into stage two.

Davey marked and mentally logged every hint of activity from the flight deck as though he were flying the RLV himself. Eventually, they drifted into stage three: a calm tranquil sail on the seas of the black cosmos. Through his porthole, now, a stunningly beautiful planet. He now knew just how dismally the simulated replica had failed to capture the amazing true-to-life image before him.

His world—his planet—was a stunning treatment of light and shade, existing at the complete mercy of axial rotation. The sun's pawn in a game that plays to our earthly notions of time and space. *But what would happen if the Earth stopped spinning? If the sun stopped shining?* Davey wondered. Such great, timeless beauty would be lost.

He looked down again at the watery planet he was effectively ditching; still a marvel in spite of the abuse she'd endured at the hands of humankind. But his heart was not dwelling on the past he'd left behind; rather it was pumping in anticipation of the future that was almost with him.

On the Halo, he knew, there would be no night and day, per se. They used lighting and some special design elements to fake a kind of

daily rhythm of light and dark, when in actuality, in their geosynchronous orbit, they'd pass through the Earth's shadow for about 90 minutes a year. There would be night and day, but a clockwork and lightshow night and day, nothing like Earth's dance of sun and shadow. And no sandy earth. No watery beaches. No humidity, no sunshine on his face, no rain on the rooftop or puddles to jump. Everything that would be anything like his life on Earth would have been fabricated to provide that simulation. But that was just fine with Davey. Everything about being a part of the Halo project was perfectly fine with Davey.

Before he knew it, as the number two shuttle, they had maneuvered into a holding pattern that afforded Davey a prolonged and awesome view of *his* beauty. His Halo. His home.

She was spectacular.

Davey was in love.

The news that Alpha Shuttle had achieved an uneventful landing was met by a rousing cheer from the passengers of Omega Shuttle. Part gratitude that someone else had proved it possible; part to mask their dread of what was the second most dangerous element, after blast-off, of their trip to the Halo. And Davey felt enormous relief that Grace and her family had arrived without incident. Now he prayed for his own safe arrival to mark the beginning of his new life in outer space.

In their gentle holding pattern orbit, Davey spent most of his time craning his neck to look in on the activities up top, where the flight crew seemed relaxed. An occasional nudge of a knob; the odd tweaking of a computer display. Davey imagined himself at the helm and tried to visualize the simulated dashboard at which he'd spent as many loving hours as allowed him. He considered the function of all of their adjustments in an effort to soak up their technique.

A sudden yaw to starboard, accompanied by a deep and rapid shudder, and the tone up top suddenly changed. Davey's instincts replied first, telling him that something was mightily wrong, and reminding him of the sensations that had accompanied his crash of the simulator. It had been the exact same kind of wrong. He was reliving that ride—him at the yoke, Kissmann by his side—when his mind kicked into gear. *NO*, it said, refusing to believe what his instincts had reported. *No... everything is fine*, his mind repeated, but the pilots' movements became more deliberate. The pace in the cockpit more frantic.

Davey watched, riveted, trying to figure out what was going on up there. His instincts took over again, and he found himself reaching in front of him, as though there were a yoke and controls there for him

to take. Mr. Andersson next to him grabbed Davey's arm and put a death grip on him. Was there something wrong?

And then... a violent pitching to his left. The other Omega passengers began to scream. He felt a frantic vibration as their ship went in for approach, but Davey *knew*... it was all wrong. He barely had time to consider what this might mean, and how he'd explain it later to his mother, when the ship was rocked by such a great force that Davey thought he would come out of his seat in spite of his severe restraints. The sound of shredding metal, the yells exchanged between pilots in the cockpit... *was that the smell of fire?*

What were the pilots doing? What was Kissmann doing? He wasn't moving around with the kind of purposefulness and deliberateness he'd expect from a situation like this. It didn't look like Kissmann was in control at all.

Following what felt like an interminable set of manic maneuvers, heightened by the screams of some of the passengers, their ship finally, massively, thumped to ground, crunching to a silent stop. Then and only then did Davey hear the alarm bells sounding.

15: THE WORLD IN A MICROCOSM

There are no passengers on Spaceship Earth. We are all crew.

Marshall McLuhan: (Canadian) Educator, philosopher, and media and communications theorist who coined the expression “global village”

“In the end, we’re most fortunate that there were so few fatalities,” Gurov said stoically. “And that the casualties were relatively minor, thanks in large part to the attentiveness of Dr. Dean, but also to the efforts of so many others among you.”

Slowly, Davey’s hand instinctively moved to feel the spot on the top of his head. He sucked air through his teeth when his fingers touched the raw wound. A clump of hair the size of a wet tea bag was caked with his drying blood.

Davey searched the audience for Grace, spotted her near the front, and held her in his gaze until she turned around and noticed him. Her arm was in a sling and she had a massive bruise on her forehead. She gave him a little wave.

Three hundred and ninety-eight Zero Colonists survived the fateful first launch, Gurov had told them. They’d lost Davey’s beloved flight trainer, Major Kissmann, and Alexei, one of Commander Gurov’s triplet sons.

Alpha Shuttle had arrived without incident. But it had suffered significant damage when Omega Shuttle smashed into it on its path of destruction through the HaloPort. Both RLVs were completely disabled, you didn’t need to be an engineer to have figured that out. Just one look. But, worse... the HaloPort had suffered extensive damage as well. And the RLVs, now no more than irreparable space junk, threatened to plug the only artery into and out of the Halo.

“Unfortunately, it will likely be some time before we know what, exactly, caused the accident. The flight crew wasn’t able to isolate any systems errors, and there is no record in the flight logs, as best as we can establish so far, of anything out of order. But we will keep you up to date on news on that front as we obtain it.”

So, that was that. Two Colonists had died. There would be no further launches. And they didn’t expect to be in a position to accept any new landings for quite some time. His mother would be frantic.

As the crowd disassembled, Davey told Mr. A he'd check in with him in the morning as agreed, and went off to find Grace. She was with her mother, who was talking with an attractive blonde lady. He approached and Grace gave him a warm smile but continued to give her attention to the lady, who was speaking. By her strong accent Davey immediately placed her as Mrs. Gurov.

"Well, if there's anything we can do, Lidiya, I hope you won't hesitate to come to Arthur or me?" Grace's mom said, patting Lidiya Gurov's hand between hers. "Though I suspect all you'll really need for a while is some peace and quiet and to be left alone! You send the other boys over to us anytime, if you want to empty the house out. Grace will be a kind host to them, won't you Grace darling?"

Grace nodded, and they all said something muttery as goodbye to one another.

Davey found himself saying "I'm so sorry for your loss," as she patted his shoulder goodbye. He got so choked up, knowing that Major Kissmann was a part of the loss he also felt, he could hardly get the last syllables out.

Grace promised her mother that she'd be home in an hour, and the two left the square, where Colonists were still milling and chatting after the All Hands meeting.

"Yeah. Me and Mr. A are on the same block. So I guess he's okay with me living in mine and my mom's house, as long as I am. Which I am."

"Cool."

"So, looks like a large number of the sections of the Halo will be closed off for a while."

"Yeah. We're only 1/8 of the Halo's planned population. Shutting some off will allow the biosphere to function more naturally, if it only has to support life in a wing of the Halo rather than all over."

"Makes sense. Sooo... have you looked around much? I mean, after we unloaded the wrecks. And got our housing. And our new secondary duties, now that there are only 400 of us for a while."

"Not yet. What did you get? For secondary duty?" she asked.

"I'm going to be working with the robots. First on some of the damage, and then eventually on the Space Elevator."

"Cool," she said again.

"Ummm... super awful about Alexei, hey?" he said, mostly because he felt like he should acknowledge it.

"Yeah. My mom is friends with theirs. And I'm sorry about your friend, Major Kissmann."

"Yeah, thanks," he said. But it was still too raw and Davey didn't want to talk about it. "So, hey, where are your quarters?"

She held out the map they'd been provided. All the lodging

assignments had been reissued in an effort to keep all the first flight Colonists closer together, what with there not being any company expected for some time to come. Grace pointed to the spot on the map where her new home would be located.

Davey, looking over her shoulder, compared her location to the one marked for him and his mother on his own version of the map. "We're only a couple blocks—" he grinned sheepishly, "or whatever you call them up here—away from each other. Want to? Walk over there together?"

"Sure. But only if we go the long way!"

"Which way is the long way?"

She spun in circles, held her good arm out, and they headed in the direction her hand was pointing in when she stopped spinning.

The little tuft of forest they walked through opened onto a clearing and then into the main shopping street. This part of the space station would remain accessible, but a ghost town, until the Halo was fully populated. Grace was awestruck. She stood stock still and nearly unblinking for a moment, while she soaked the image up through her pores. She turned and looked back into the forest, then turned again and looked down the length of Main Street. Then tipped her head backwards and looked up into the ceiling of the Halo, with its fake sky image broadcast by a see-through digital curtain.

And then, just as suddenly as she had stopped dead in her tracks, she was off. Screeching, hollering and pirouetting as she ran down the deserted main street that bisected the width of the Halo. Davey, laughing and calling her name, yelling to her to slow down and wait for him, took off after her.

They ran. Past look-alike homes, low-rise structures, tiny open green spaces, and tree-lined sidewalks. They ran until they were entirely breathless, eventually stopping in a small park-like setting; a little garden of earthly delights, that represented the outer boundaries of their cordoned-off, unrestricted zone. The end of the line, as it were.

Grace danced a little touchdown dance then tumbled to the ground at the base of a tree. And Davey, after spinning around the tree's skinny trunk like an airplane a few times, sore head forgotten, landed seated beside her. He looked at her with his canyon-wide smile. She was on her back, her exuberance having given way to sublime serenity. Davey followed her gaze, looking up, at the big blue marble they used to call home.

Lost in the sight, he dropped first to being propped up on his elbows, and then flat on his back.

They both lay on the ground, silent, for what seemed like eons.

"Could you ever have imagined?" Davey finally asked.

"Never." A long pause. "You?"

"Nope. Never."

"Mmmm."

They lay in silence for a while, and then decided they needed to share this moment. Davey suggested they wait a couple of minutes for nightfall, which was scheduled to be at exactly 9:00 P.M. They'd begin to record as all the bright, fake daylight lights that simulated sunshine around the Halo extinguished, and video the fake sky curtain turning to night and put it on their first Halo vlog together.

Efforts had been made to counter that feeling of sameness that cookie-cutter neighborhoods invariably had. But Davey couldn't help but feel that his new home had a sense of inevitability to it. Marry that with the fact that many of the component parts had been manufactured and then assembled robotically, right there on Hart's Halo. They were built using a kind of ThermoJet printer whose "ink" was a special powder that would dry as a resin to form 3D objects like chairs and tables and street paving and park benches. The net effect was a pristine, but sterile, uniformity.

Davey was surprised by the compactness of his new home, even though they had seen mock-ups of their future homes in the Hartland complex, and had even virtually visited them with Hart. Somehow it felt different—smaller—when it became your real environment.

But a couple of days later, he was beginning to feel at home in his home away from home. Missing his mom, but still able to feel at home where he was. They'd had a couple of good talks, and he was actually pleasantly surprised to see that in fact his mom was coping quite well.

Though the days were unnervingly long, they were bright and full beyond measure.

Davey was out on his little postage stamp of a patio early on one such day, when Grace stopped by for a visit. He had seen her approaching from half a block away, her hot pink sneakers matched by the tail of hair at the nape of her neck. He noticed with interest that she appeared to be following an unusual pattern, criss-crossing the pedestrian street at bizarre intervals. For a moment, he wondered whether she was indeed headed his way, but by the time she approached his patio, it had dawned on him what she was up to.

"Were you just ducking the cameras?"

"Too right! Bad enough we have to be space guinea pigs for all the world to marvel over, I'm not going to give the gawkers any bigger piece of me than I have to. And, for the record, that would be *nothing* if it hadn't been for a promise I made to Uncle Ollie."

"Me too, I suppose. The much coveted Lottery Boy slot. You know, the *I'm just simple folk like y'all, why doncha come join me on my gorfy space adventures...* I have to vlog at least once a week now we're up

here, did I tell you that?"

"Vlog only? Do PEEPs count? Or do you always have to do those more formal: *Lottery Boy's log, stardate 5773.9, coming to you from the Halo...*" She said, mimicking her best Captain Kirk voice.

Davey laughed. "No—PEEPS are good too."

"And now that we're *it*, I guess the scrutiny is just going to get more daunting," Grace acknowledged. "And I'm guessing it gets pretty hot under the magnifying glass, so this bug's gonna bug out wherever she can!"

Davey laughed. And wished fleetingly that he had either the will or the way to be more free flowing, like Grace. "I'll get us some drinks," he offered, and stepped back into his home.

Grace removed her ONE from her wrist and fiddled with the selector. "Here, listen to this," she offered as Davey returned, changing the setting on her ONE so instead of transmitting to her wirehead implant, it would broadcast through the audio speakers that were built into each home's outdoor space. She found Davey's speakers on wifi and connected. A layered rhythmic piece with a haunting melody spilled from the tiny speakers over Davey's compact yard. She smiled and nodded in time, willing Davey to appreciate her selection. She sat on one of the patio chairs and they listened companionably for a few moments.

"You ready for tomorrow?" she asked eventually, sipping her Carbon8 soda.

Davey took a sip of his own soda, and took a seat next to Grace. "I am. I'm ready to be busy. And I guess I'm looking forward to getting to know Mr. Andersson, as a teacher, you know? He is a nice enough guy in general. You know what I mean?"

"Yeah," Grace agreed. "My mom knows him and seems to think he'll be an excellent teacher. For whatever that's worth," she added with a smile. "Oh, hello Miss Meow Meow!" she said, gently, as Davey's Chip Cat, LooAnne, poked around the corner of the patio doors.

"So you're kind of a music freak? That's why you're a wirehead?" he asked, referring to the fact that Grace had, like many of her contemporaries, a tiny wireless receiver implanted just behind each ear. The output from Grace's ONE fed directly to her receivers, allowing her to forego the usual cords and cables to connect to an earpiece, like Davey would have to do to listen to his music.

"There's just something about Arcade Fire, you know?" Grace asserted. "The way they make it so you can feel their music?"

"Yeah... like... because it's actually *vibrating* your ear bones!"

She smiled. "Yes! But not. Not like *that*! Nobody else does it quite like they do, wirehead or not." She grinned broadly. "Kind of explains why they're such legends, I guess."

“LooAnne seems to like them, too,” Davey said, laughing. The cat had hopped up into his lap and was nuzzling and purring robotically in time to the music.

Grace reached over and mock-patted the cat. “She’s cute, if you like a sardine can for a pet,” she said, smiling. “Not quite like having the real thing, though, is it?”

Davey confessed that he missed Bitz, and that LooAnne, while very friendly and much more sociable than his real cat at home tended to be, was no replacement for the real thing.

“I miss my horse,” Grace said, weakly. She was trying to show a brave face, but Davey could see that Grace was upset.

“Whoa, yeah?! A horse? Wow, I guess you would.”

Grace only shrugged her reply. She looked as though she was trying not to cry.

“What? Fish as pets don’t cut it for you?” Davey asked, dripping sarcasm, hoping to inject a little cheer. The fish he referred to had been transported as cargo on their RLV; coming to the Halo as fry, they were stocked into the Fishery and would eventually serve as the Halo’s only animal protein food source. Currently, Colonists were eating freeze-dried stores of meat. The fish couldn’t grow fast enough, if you asked Davey.

“I miss all animals,” Grace pronounced.

“Not all...”

“Sure, all of ’em.”

“Okay, you miss...ummm... the duck-billed platypus?” Davey teased.

Grace scoffed her reply.

Sensing the prospect of an appreciative audience, Davey took up the comic rant: “What kind of a name is that, anyhow? Platypus... and duck-billed, no less? And how come he gets all the fame and notoriety? What about his cousin, the flat-footy platypussy? Nobody’s ever heard of him, now, have they?”

Grace giggled, fueling his riff.

“How about the sour-puss platypuss?” They laughed.

“The gloomy-gus platypus ...the big woos platypoos?”

“Oh, Davey!” Grace shrieked between riffs, her laughter infectious.

“How about the philosophical platypus? The drunken platypus...” Davey sent them off on a tangent. Grace was snorting by now, but managed to sputter: “Square root of platypus,” before they both disintegrated into laughter.

Her laughter now calmed to occasional little nasal huffs.

They sat for a quiet moment, Davey enjoying, not for the first time, this spectacular view of the meridian sun that illuminated their home planet.

Then, as though plucked out of the aether, a thought struck him. "Do you think this mission is doomed?" he asked her.

The change in Grace's expression made him reconsider whether this might be a topic worth pursuing. "I just mean, so much stuff has already gone wrong, you know?"

"Yeah. I do," Grace said, leaving it there for a moment. And then she broke the pensive silence: "Doomed platypus!"

"Reincarnated platypus," Davey offered with a smirk.

Grace looked thoughtful.

Davey heard a ruckus emanating from a few doors down, as the Tornqvist boys spilled out their patio door and ran for the sidewalk. Their mother, Ulrika, the Halo's Chief Botanist, would become Davey's mother's boss. She followed them out the door, calling to her three boys—Rikard, Niklas and Gustav—to slow down and wait for her. Or so her tone suggested. The Tornqvists, while they spoke perfect English, spoke their native Swedish when at home.

"I wonder if they are bio-babies," Davey said, looking at the triplet boys as they ran ahead of their mother. Davey knew the relatively new procedure had been developed in Sweden, and the boys would be about the right age. He had just been making conversation, any conversation, just to change the subject, but noticed that Grace had gone kind of prickly.

"What's wrong with that if they are?" she asked.

"Well... nothing at all, of course," Davey answered, retreating.

"It's a perfectly acceptable procedure, you know?"

"Sure... I know. What's the big deal?"

"What do you mean: *big deal*?"

"Well, I didn't mean anything by it. Yet you assume I was making some kind of... I dunno... judgement, or something... on bio-babies."

Grace looked thoughtfully at Davey for what seemed like a long time. He was just beginning to grow uncomfortable under her gaze when she spoke. "*I'm a bio-baby, okay?*" she said defensively.

"You?" He was truly stunned.

"Yes, me. And, no, we're not always made in litters. My mom just wanted one child," she asserted, her tone acerbic.

"But you're *my* age."

"I know. I guess I was one of the first. My dad is one of the world's top medical researchers, you know, in addition to being a flight surgeon for Hart."

Davey had not known.

In actual fact, Grace had been one of the world's first (and few) bio-babies: children whose genetic material was screened and engineered as embryos in an effort to select the most desirable features. Her parents—the brilliant ship's Chief Flight Surgeon, Dr. Arthur Dean,

and his wife, Chief Space Engineer, Roberta Dean, Ph.D.—left little by way of genetic potential to the imagination.

And Grace was pretty much perfect, Davey reflected. She was beautiful, even if she did seem a little awkward in her own skin sometimes. And she was brilliant, though reluctant to demonstrate it very openly. Or so it seemed to Davey, anyway. Basically, pretty much like your average twelve-year-old. *A bio baby, hunh?* thought Davey. In a strange way, maybe it explained some stuff about Grace. Like how she was always trying to live up to something, and kind of halfway apologetic all the time.

Like most people, he guessed, his familiarity with the bio-baby concept was limited, to a degree, by what he'd read or heard about it. Making a baby by first assessing the embryo's DNA... that was kind of a complicated thing, and people's opinions on the practice varied widely. Grace obviously had her own issues about finding a biologically pre-determined place in the world. She seemed to be struggling with her inauspicious start in a Petri dish. And to be feeling some sort of shame or embarrassment or something for having been deemed perfect enough for life.

"Oh... I see," he said, nodding, his tone one of mock-understanding. "You mean, like you were a *test case*? I guess they were still trying to get the bugs out of the process back then?" Davey said this with a smile, hoping he could lighten the climate of what had become an unintentionally serious conversation. He was relieved when Grace joined him in the smile, and then flinched in feigned surrender when she punched him gently on the shoulder in admonishment.

Davey checked his chrono. "I'm going to have to get going soon. I have to be at the Space Elevator for training in about forty minutes. They've got a robot giving me a tutorial, if you can believe it!" Davey would be putting in a couple hours at the Halo's Space Elevator's robotic construction site each day.

"Still willing to trust those damned robots with your life?"

"I'm not *that* fearless," Davey said. "I won't let them get *too* close." Davey told Grace he wouldn't have minded having the Gurov brothers' secondary duty, which was to take impromptu video footage for the Halo reality show, trimmed back to a few special episodes from the planned weekly broadcast in light of the mission's ongoing issues. The show would splice stuff caught on the "candid cameras" (as Grace was painfully aware, much of the Halo was wired for picture and sound) with some of Viktor and his brother Mikhail's footage. Davey admitted to being a little jealous of what seemed like a cool job.

"Oh, crap... errr, sorry..." Grace smiled wryly. "What time is it, anyway?"

Davey told her.

“Oh okay, I still have a little while. I’ve got to put some time in on the community gardens before lunchtime.”

“Is that your secondary duty?”

“Nope. Mine’s at the Comms Center. The garden is volunteer time. But I won’t have time... I mean... I wanted...” She stopped short.

“What?”

“Oh, alright... I wanted to do some reading before school tomorrow, okay?”

“Reading?... Really?”

“I know... I’m a brown-noser and a keener, alright? I admit it.”

“Yeah, I know it.” Davey said, smiling at her. “I wouldn’t waste my time with the Cosmology stuff, by the way. I’m guessing it’s stuff you’re probably plenty familiar with.”

“You too, hunh?” Grace said, smiling, obviously relieved that she wasn’t the only one eager to get a jump on their curriculum.

“But the Technology unit was cool,” Davey said cheekily, enjoying that he was catching Grace out at her own game. And that they seemed to have eagerness and studiousness, too, in common. “You’ll sail through it this aft. But... first we skate!”

“We skate?”

“I know you hardly ever use them, but you have micro-machine powered skates, like mine, right?”

“Riiight??”

Davey went and fetched his skates. He held one out for Grace to inspect. She spun it around, examining from all angles. “Magnets?” she said at last.

“Just the right strength of magnet to hold the skate to the columns that are what you might call the structural backbone of the Halo. With plenty of clearance from the Tubes, if you’re wondering. Though they won’t even be a factor until the Tube starts running in a couple of weeks, anyhow.”

“Oh, you didn’t?”

“No. Not yet I didn’t. But I made you a set too. And figured out how we’re going to do this. Go on... hurry up and go get your skates! And I’ll tell you all about it on the way over.”

Davey had both pairs of skates in a bag over his shoulder. They wriggled through the back window of an empty building on Main Street that was a dark and silent grocery store.

He took her up to the roof.

“Oh my gosh, Davey!”

“So we climb up that rope ladder, and onto the platform.”

“You put that rope ladder here? How did you know there was a platform? Wow have you ever studied this place!”

There was just enough room on the tiny workstation platform for

the two of them to sit down and swap runners for skates. The platform was sort of attached to the backbone of the Halo, and provided a trap door exit from the sky of the Halo that allowed maintenance to be done on the outside of the structure.

"I'll just give you a boost, and you hang upside down and let the magnets hook you to the spine of the Halo. One little push and you can ride on the spin of our orbit to assist your propulsion. By my calculations, you should do the full kilometre in like six minutes."

"You rat! You couldn't do this alone! You needed a partner in crime!"

"So, who's going first, partner?"

"Well... me of course!"

Davey helped her get a magnetic hold on the Halo's spine. A little push, and she was gone. Grace came back beaming with delight. They laughed as she recounted her ride, while she boosted Davey up and into place to begin his. Davey took his turn, and could immediately understand what had given Grace such pleasure. Until he rounded the final bend home, and the smile dripped off of his face. Ahead of him on the tiny platform was not just Grace, but Grace and Captain Creepy.

"We were totally lucky there," said Grace as they neared Davey's house.

"What? Getting busted you mean?"

"No. That he just gave us the super glare and sent us home."

"Yeah. I suppose." Davey was bummed they got caught so quickly and that he'd never again get away with circling the roof of the Halo like that.

Davey watched as Grace fiddled with the ONE she wore on her wrist, in preparation for her brief walk home. Most people treated their ONE like their best friend and, whether worn on the wrist or on a lanyard around the neck, were completely inseparable from it. Grace was no exception and, setting hers to *tunes*, began the personal sound track of her young life.

She smiled at Davey. "Walk with you tomorrow?"

16: LOL... YES, THEY HAVE TO GO TO SCHOOL UP THERE 2

The most important thing about Spaceship Earth - an instruction book didn't come with it.

R. Buckminster (Bucky) Fuller : (American) Engineer, author, scientist, designer, inventor, and futurist. Inventor of the geodesic dome.

VLOG Archive: Davey Randolph shared a post with Grace Dean
Title: Starry Starry Night
Posted: 09 23 2033 / 21:08 EST

(fuzzy focus in and out) You talk... (laugh) You can't shake your head 'No!' They can't see you yet, they're looking at the sky, like us. Wait... here. (the camera flips to front facing and lights up with two happy, smiling faces) Okay... sorry guys but Grace isn't talking yet. So... we're here. (a sigh, his tone changes to serious) As you know, it was a super rough ride, and... ummm... our... condolences to the families of... of the people, the Colonists, who were lost. We'll miss them. (Davey's brow knots up. A few seconds of silence, then Grace smiles wistfully) Hey! I know. Maybe we can dedicate tonight's PEEP to them? An excellent idea, Grace. In fact, it's almost curtain time now. How about we show these guys some stars, and each of them can choose one and, ummm, make a wish for Alexei and Major Kissmann, or something? (camera flips to the sky, they lay quietly looking up for a second, until the environment control curtain begins to close exposing a starry night sky) I guess that's it for us for today. There goes the curtain. It controls night and day, mostly to favor plants and their biological rhythms. But people like us like it too. I know I do. Me too.

Launch One had landed fifty-six kids between the ages of three and twelve on Hart's Halo. Actually, between three and thirteen, now that Davey was the first of the twelve-year-olds to have celebrated a birthday past the September fifteenth cutoff. This group represented significantly less than the one-eighth of the Halo's planned youth contingent that might have, at random, come up in one-eighth of the RLV shuttles. This was because top priority selection had been given to essential staff, with preference for single professionals where possible, for the initial launch wave.

Those children who did arrive on the Halo on that fateful first launch, of course, needed to get settled into a routine. And so, with fifty-six eager, if a little nervous, new students from pre-school to seventh grade, the doors to Galaxy International School were officially opened on Monday, October 3, 2033.

Dr. Wainwright, the school's headmaster, was not among the first

Halo Colonists. With a wife and two children, his travel was deferred in favor of an unmarried and childless teacher who would take up less space. So three individuals had been assigned responsibility for the children's education: Davey's guardian, Mr. Andersson, who was a young bachelor and the only actual teacher among them, would oversee the program as well as take responsibility for the largest chunk of students—thirty-one kids aged nine to thirteen. Ms. Locke would be responsible for the early primary grades, made up of sixteen children. And a kind, older woman named Mme. Rousseau would look after the pre-schoolers—a total of nine little people.

Davey's first impression when entering the Learning Centre facilities can only be described as awe. His old school, certainly not even in the best of Rednersville neighborhoods, had been institutional at best. And while he had seen some of this learning environment in the recreated virtual Halo, nothing could compare to experiencing the space with all of his senses, instead of just with his mind.

The beautiful wide-open central area, with its fluffy carpeting and gooshy armchairs, was by far the most kid-friendly place he had yet seen on the Halo. Bright and cheerful, with its cotton candy color scheme, it was intended as a place for the kids to congregate, work and relax. It had rooms off the main space that could be used for group meetings. There was a snack area, and a play and gaming area, as well as a quiet section for study. And, of course, it was much more vast a space when you knew only thirty-one kids would be using it, as opposed to the hundreds of kids for whom it had been designed.

Down one main corridor, much of which had been roped off for lack of need, were the classrooms. Also bright and cheerful spaces, they were set up as a mix: long rows of desks, staggered theatre-style, each seat equipped with its own OMNI stations; and informal chatty kinds of classrooms that featured clusters of armchairs with small tables in the center. It was to one of these latter kinds of classrooms the kids were directed to for their morning assembly on the first day of school.

Because of their numbers, and the relative shortage of teachers, the kids were told that they could anticipate working in groups from time to time, and that they would be expected to do a lot of work independently.

Group work... great, Davey thought.

If one factor defined the children who came to the Halo in the first wave, it was their parentage: all were the offspring of the Halo's most talented and respected in their fields. Not surprisingly, then, the children of these scientific luminaries were pretty interesting themselves. Many were super smart and geeky, and some just acted superior—maybe because of their parents' successes. In any case, they were entirely unlike the kinds of kids Davey had gone to school with

back home. And, among these largely super-achieving kids, was Davey, who had never felt more ordinary in his life.

They spent the morning getting acquainted in a variety of activities and games that Davey found closer to embarrassing than educational, but he couldn't fault Mr. Andersson for his abundant effort and good cheer. He and Grace gravitated toward one another most of the morning, unless separated into different groups by Mr. A's cruise director-meets-social organizer antics.

Toward the end of the day, Davey found himself assigned to a work group that included himself, Grace, Bhuvana and a boy he had yet to meet but whom Grace sat chatting with, having shared an earlier activity with him. Their group was also joined by a set of fraternal twins—one of at least six groups of multiples Davey thought he'd counted from among their ranks, multiple births being just so common in his generation. All the kids had their names embroidered on their uniforms, but the duo, immediately and with enthusiasm, introduced themselves as Annie and Will Woodhouse. Davey found his interest fixed on the twins, who appeared to be a couple of years younger than he and Grace. He hadn't really ever stopped to think about it before but, in that moment, he wondered what it would have been like to have had a brother or sister, much less a twin.

And then, just as Davey thought they were ready to get underway, he watched as Viktor separated himself from his brother and their small group, and sauntered over to join his. Davey choked back his immediate reaction, willing it to crawl back into the hole it came out of. Instead, he focused his energy on the hope that perhaps having Viktor separated from his peanut gallery would make him easier to contend with.

Viktor plopped down in one of the chairs in their cluster, slouching into it with his legs apart, lax limbs outstretched over the wide arms of the chair. When his glance passed casually over Bhuvana and she offered him a brief smile of acknowledgement, he continued in sweeping his assessing gaze around the circle without so much as a hint of recognition for her. Instead, he caught Grace's expression from where she sat, next to Bhu. Her look said to Davey "*What an a-hole.*" She then turned to Viktor, giving him a withering look.

"Hello," said the unfamiliar boy, when Viktor's eyes settled on him.

"Jan... what kind of name is that?" Viktor asked, reading from the boy's uniform name tag. "Where are you from?"

"South Africa, but it is pronounced *Yan*. It's Afrikaans for John."

"So, why you don't just be John, then," Viktor smirked.

A moment of silence. A prickly, uncomfortable pause.

"Because his name is Jan," Davey piped up, feeling at once terrified

and thrilled that he had stood up to Viktor, for Jan's sake if never for his own. His ears flamed red.

"Ladies and gentlemen!" Mr. Andersson clapped his hands to still the chatter as he called out.

"Your assignment?" With the flick of a switch, the back wall of the classroom became a broadcast screen. On it, were the following words:

**Are we not drawn onward, we freer few, drawn onward to
___ ___?**

"Or should I say your *first* assignment..." a gentle smile. "As to the rest of it, you will be leaving here with your group tasks, which were prepared specifically for each group by those oh-so-clever educational expert-type folks at Hartland." Davey was pleased to hear the echo of groans that mirrored his own enthusiasm for group work.

"Fortunately, we have an eager and efficient Academic Planning Team back at Hartland. You'll be happy, or not..." he paused and flashed a huge smile, "to know that we have a couple months' worth of personal lesson plans already awaiting your studious intent. The great eggheads back at Hartland, in their infinite wisdom, have me equipped to the eyeballs up here." He punctuated this comment with another smile.

He held up a thin stack of papers. "This will represent your first stab at independence in this classroom. Tomorrow, you will work as a team; that is, with the exception of this group over here." He waved a hand at the group sitting nearest him. "Getting rid of the rest of you," he gave them a wry smile, "will allow me the opportunity to spend some intensive time with this group of bright shining faces, and get them on track with their learning program. I will be doing the same, with a new group every couple of days, until I've worked my way through all of your small groups. And this is the way we will have to operate, with lots of independent study. Until further notice, at any rate." Mr. A smiled, as though to dismiss the deeper meaning to what he was saying: that until someone could pull off some miraculous fix to the mess they were in, they would have to accept and make the most of the hand they'd been dealt.

"Now, remember, guys, this isn't a holiday or a day off. I'm sending the rest of you out to fend for yourselves, as it were, with the trust that you will behave like the young ladies and gentlemen that you are. And that I won't be receiving any reports of the havoc you've been wreaking around town." He winked.

"So let's get on with it, shall we? First up, get together with your groups and give us a solution for this," he said, pointing again to the back wall.

Viktor started right in. "So, who knows this quote? Anybody see or

hear this before?" Davey didn't respond. His mind was quietly chewing on something. Something as yet without flavor or really much texture, but he could feel it on his tongue.

No response.

Then Grace chipped in, "Well... it isn't a familiar quote to me, but it does appear we are looking for the last two words." She pulled her legs up under her in her roomy sofa-style seat, and Davey noticed that she was wearing a pair of screaming lime green sneakers, which matched today's version of the color swatch in her hair. Definitely not standard uniform issue. She caught him looking, and smiled a subversive little smile. Davey grinned, finding he admired Grace's bold but subtle effort to tinker with the school's dress code. And on the first day of school, too. She didn't waste any time!

"Sounds sort of like some *important* sort of saying... know what I mean?" Annie contributed.

"Pip's right," Will agreed. Judging from the glaring look his sister gave him, coupled with his own sheepish response, it seemed that he'd just inadvertently revealed Annie's nickname. And if Annie's look was anything to go by, she'd torture him for it later. "Errr... that's to say, it sounds like something political. Like maybe from a speech, or State of the Union address or something," Will added with a shrug.

Jan brought up a 3D projection keyboard on his ONE. Obviously an add-on feature not available on the basic ONE model he had been issued. It worked much like the virtual keyboard on the INFOTron back home. Back at his Hartland home, that is. Only this 3D keyboard had been redesigned for easy use with just one hand, as most people wore their ONEs on their wrists. Jan was just launching an OMNI search on his ONE when Mr. Andersson's voice rose above the din of a classroom now busy at work. "Oh—and... ladies and gentlemen? No technology please. That would be too easy. Let's use our noodles for this one, shall we?"

Jan looked at Davey, smiling. "Rats," Jan said, powering his ONE down, and Davey decided he might just like this guy.

Bhu looked intent, staring at the assignment on the wall. Annie and Will were talking between themselves.

"Well... come on! Somebody must have some kinds of ideas," Viktor chastised. "I want to get home early today, if there is some hopes for that." He looked at the clock face on his wrist ONE, and then over to Davey. "Well?" he said, and Davey felt the heat of his spotlight once again.

"What?" he asked. "You expecting me to just pull this one out of thin air?"

"Why not? It works last time, no?" Viktor pushed.

"No. Not quite," Davey said, and felt a spark of energy from his

willingness to stand up to Viktor, at least in this forum where his brothers weren't there to incite him, like last time. *Brother*, that was. He reminded himself to cut Viktor a little slack, given what he was probably going through since Alexei's death. "That was a little different, wasn't it?"

"How do you mean?" Viktor asked. But Davey didn't reply, his mind was churning now. A cog had fallen unexpectedly into place and was spinning some of the wheels that had previously been slipping.

Grace answered for him. "That was a puzzle, that, ummm..."

Dr. Hart prepared for us. Right, Davey?"

"This too," Davey uttered below the group's auditory radar.

"What?" Grace asked. When Davey didn't appear to have heard her, and continued staring off into space, her voice grew slightly more insistent. "Davey? *What?*" At which point, Davey transferred his glazed look over to Grace, then slowly brought it back into focus.

"He said *solution*. Solution... not *answer*. Not *response*. Solution. It's a puzzle, too." *From Dr. Hart?* he wondered. Again, that nagging finger in the ribs. Hart's last puzzle. The ePost he'd sent Grace and Davey. *Sometimes what you are looking for is right before your eyes. Oliver Hart.* He shook it off, and tried to focus.

Viktor looked doubtful. "It sounds like the same things to me."

"Let me see that thing again," Davey said, reaching over to Grace's Tablet where she had copied the text. It read: **Are we not drawn onward, we freer few, drawn onward to ____ ____?**

"*Drawn onward... twice,*" Davey mumbled.

"What are you driving at?" Bhu asked Davey, leaning in, clearly captivated.

"I, uh... I really don't know. It just seems like a focal point for me. *Drawn onward...* Maybe the repetition? I don't know..." He continued to silently roll the words around on his tongue. "And that fragment: *we freer few*. It's saying something. But what?"

"It's saying something about us. It's sounding like it was written about us," Viktor challenged. "Maybe this is coming from one of Oliver Hart's speeches, or from some kind of HART Corporation advertisings or something?"

"Shhh..." Grace shushed Viktor dismissively, her eyes still set on Davey. "*We freer few...* go on, Davey," she encouraged.

Like an impressionistic painting, puzzles could sometimes feel to Davey like random dapples of color scattered haphazardly on a canvas. But if you changed your perspective, and pulled back—withdraw—the colors would take form, as though magically, to create a beautiful, satisfying, and even unexpected image.

Davey scribbled on Grace's Tablet. Before he could return his focus from the recesses of his imagination to the classroom, Grace had

already helped herself to taking back her Tablet.

She read it: NEW ERA. And smiled.

Grace raised her hand. “Mr. Andersson? What do you want us to do if we think we have the answer? Davey has the answer,” she added proudly.

Mr. Andersson raised an eyebrow. He closed the folder he had only just minutes ago opened, got up from his seat, and made his way to their cluster of chairs at the back of the learning space. Grace held the Tablet out to him as he approached, and he took it and read it.

Davey saw a smile creasing at the corner of Mr. A’s mouth. Light attached to his freckled blue eyes. He looked directly at Davey but said, ostensibly to their entire group, “Well done, kids. Well done indeed. Mr. Randolph, would you please join me at my desk to receive the password to access your group’s electronic assignment folder? You’ll find all of the materials you need stored in there, in our school cloud. As for the rest of you, take solace that a solution is at hand for all those with flexible minds. And, yes... that’s a hint.” He smiled at his own wit.

“I should add... we’re going to be pretty relaxed about our uniform policy from here on in. We’ll only come in uniform on days when we’re all going to be here together. And if, like Miss Dean, you feel justified in requesting some flex to the dress code... well, I’m a pretty flexible kind of a guy. Give me five hundred words to state your case, and we’ll see what we can do?” He winked at Grace and Davey was surprised to see her blush. As Mr. A turned on his way back to his desk, he continued muttering, “That was good work, young man. Good work.”

Davey felt uncomfortable as he started to pack his Tablet up in his backpack, but Grace and Bhu were ecstatic. They’d barely made it outside the classroom when Grace began explaining the puzzle to Bhu, he could just overhear. But Davey could see that Jan wanted his attention.

“That was quick! Fabuloso! But what the heck was the answer?” Jan asked ebulliently.

Before Davey could begin explaining, he sensed he also had Viktor’s burning gaze resting on him, attentive to his word. “It’s a palindrome,” Davey said. “A word or group of words that are written the same way backward as forward. Like kayak. Or... it can be a sentence, though most of them don’t make much sense. What’s that famous one, again?... *a man, a plan, a canal – panama*. That’s all this was. Though I have to admit, it did seem kind of relevant to our situation; the meaning of it, you know? And that almost tripped me up. But it was just too smooth. Too perfectly textured. And that bit in the middle? That was what tipped me off... because it was a

palindrome itself... *We freer few.* That was good.” Davey was feeling the joy of his discovery, sharing it with Jan that way. And was feeling determined not to let Viktor’s sour look undermine it.

“Good work,” Viktor said. And Davey felt, for a moment, guilty that he had underestimated Viktor. “Now I can get the heck out of here,” Viktor finished.

Davey knew his initial assessment of Viktor was, while perhaps none too generous, sadly, still pretty accurate.

After school, Grace and Davey retraced their path home together.

“Davey?” Grace began.

“What is it?”

“Back at school, when you were zoning out... on that puzzle? You said something about ‘this too.’ What did you mean by that? Did you mean this is a puzzle too, or that Uncle Ollie prepared it for us too?”

“Oh, just that all those puzzles Hart’s thrown at us all along, from the very beginning—for me, at any rate —’cause I had to solve one to get through the lottery assessment, too... it sort of felt like his work, I guess.” Davey knew he didn’t sound very convincing.

“But... but Mr. A said that all of our work had been created by an academic planning team or something. Why do you think Uncle Ollie would have had anything to do with that?”

“I guess I don’t, really,” he offered weakly. “It just makes me think of him, I suppose. Puzzles and stuff. I guess it sort of makes me miss him.” The rest of what it made Davey feel he’d decided to hold in his private thoughts, at least for the time being while he was still making sense of them.

They could see Grace’s parents just arriving at the time they rounded the corner onto the narrow block of residences where they lived. Her mother had evidently noticed the duo too, as she stopped at the foot of their walkway and waited as they approached.

They had perhaps seen one another in group settings, like at the registration session way back when and at the All Hands meeting when they’d first landed. But Davey had never, in fact, been introduced to Grace’s mother. Or to her father, for that matter. Though he certainly knew who they were—had even nodded to her dad when they had crossed paths at the Hartland training campus once. He’d always avoided meeting Grace’s family because of the sense of shyness that overcame him at the thought.

“Mom, this is my friend, Davey. You sort of met him the other day when we were talking with Mrs. Gurov.”

“Of course,” she replied, smiling warmly at Davey. “Grace has mentioned you to us.”

Davey returned the smile and a quiet greeting, but found himself wondering how Mrs. Dean’s eyes could simultaneously take on such an

assessing squint and a veiled, pensive distance. Like she was looking deeply at him, and looking right through him at the same time.

“What... ummm, I don’t think Grace has ever told me who your parents are. What is your family name?” Mrs. Dean said, seeming to Davey to be weighing and considering very carefully just what she asked, and how. By this time, Arthur Dean had returned from the front stoop of Grace’s home to join the group at the foot of their path. Davey noticed that Grace’s mom and dad exchanged a look, but it passed before he could hope to attach any more meaning to it.

“It’s Randolph, Dr. Dean. Davey Randolph.”

“And what do your parents do on Halo, David?” she asked.

Grace was growing increasingly agitated, he could see.

“Actually, it’s just going to be me and my mother in the Colony. Her name is Carrie... Carrie Randolph? She’s ummm, going to work in botany. But it’s just me up here. For now.”

Now he found himself wondering: If she knew so little about him, Grace mustn’t have mentioned him to her mother much. Like... at all. If she didn’t know his last name, who his parents were, or who his mother was (or wasn’t), or where he came from... then what, exactly, *might* Grace have told her about him?

But was it really possible that she could know nothing at all about him? Especially given she must know her daughter has been spending so much time with him? So were her questions real? Or was this her idea of polite conversation? Because it wasn’t his kind of conversation. This was the kind of conversation that made him squirm.

Grace’s mother launched back in awkwardly. “Yes... well, ummm, David, it’s very nice to meet you. I suppose you kids will be spending a lot of time together?”

Grace gave Davey a look that so clearly said *ee-gads, I share your pain* that his embarrassment shrunk just a little. Grace definitely had picked up his vibe of discomfort and, quickly making their excuses for them, she whisked Davey away.

17: GOING FOR GOO

Black holes are where God divided by zero.

Steven Wright: (American) Comedian

“I don’t know, Viktor...” Nope. Davey really didn’t know. Of course, he wanted to go, too. But not at the risk of the trouble it might bring.

“Oh, come on. You seen for yourself now how easy it is, when Hart takes us on virtual tour...”

“Yeah, Viktor. *Virtual* being the operative word? Not to mention that this sector is *closed*. And not just to us; to everyone.” Grace voiced her frustration, punctuating it for emphasis with a bulgy-eyed look that said *get real*.

“We are done group work. We go everywhere on the Halo that Mr. Andersson sends us. And look where we arrive: right by entrance to the gOo. Tell me you are not dying to go there?”

Jan’s look said he was dying to. All the kids, by now, knew of the gOo zone. It had been a topic of near revolt when their Commander (Viktor’s own father, it should be noted) designated it among the out-of-bounds areas when establishing the makeshift parameters for their revised population of the Halo. But the tantalizing gOo, with its zero-gravity environment, was a mesmerizing prospect to these kids, who had longed to experience the full sensory spectrum of their lives in space aboard the Halo. Living on the Halo was like simulated Earth. Simulated night and day and gravity, but it felt pretty much like home. Now, the gOo? That was what space was all about!

They had travelled around the circumference of the Halo that day on an orienteering treasure hunt of sorts. The pre-flight training coordinators had created this “learning unit” to familiarize the young Colonists with their space home. And to familiarize them with the GPS-like feature of their ONE as it applied to the coordinates of their new space orbit. The ONE’s GPS worked much the same on the Halo as it did on Earth. But, because the Halo was always spinning, it had to have its own standard for describing and mapping its interior geometry, with each point “owning” its own unique identifier, just as a GPS would plot an earthbound locale. Tiny transmitters were situated throughout the Halo, in fixed locations, to serve as GPS-like

way points. In this way, any location on the Halo could be located and plotted by their ONEs.

Will and Pip (who had reluctantly but resignedly accepted the inevitable: She was as stuck with her nickname here in space as she had been on Earth) had been avid GEOcachers on Earth, and led the group through their first few finds. Davey found that he quickly became immersed in the game, and was enjoying the thrill of the hunt.

They had traveled from one GPS way point to another. And, at each point, with the help of a clue (e.g. “park bench”) had to locate the object within which their next GEOcache lay hidden. Inside were a clue and a way point for the next stop on their treasure hunt. Each new way point was accessed by riding the Halo’s transportation system around the ring, and following the instructions provided by their GPS.

The Tube—short for PneumoTube—had only been opened the previous day. It was effectively the Halo’s subway system, though it ran around rather than under the outer ring of the Halo, its tunnel in full view, two tubes wide to manage the flow of cars. The group had loved their whooshing rides in slick three-seater carriages, pneumatically propelled on a rush of air through an airtight glass tube. They had all ridden the simulation at Hartland at least once in their training. But here, for real, it had felt more like an amusement park ride than a method of transportation. So they had ridden around all day, much more than was required for their task. Operating more like an elevator (you called for a carriage and it came) than a subway system, the Tube cars held up to three people, sitting one directly behind the other.

Every Tube station was effectively open, though the areas of the Halo with limited access did not allow exit from the Tube station without proper authority. Each Colonist had their specific access permissions encoded into the profile attached to their retinal scan. Without the right permission, you could visit any Tube station but only leave the station in areas where you’d been granted access. But because the g0o was general access, the entrance to g0o, where their last GEOcache clue had landed them, was right at the Tube station platform.

“We know how works the lift into g0o, right?”

“Viktor, come on. There’s a huge difference between taking a virtual ride—with Dr. Hart—and a real one. And we didn’t even experience the g0o access, because they hadn’t finished creating the simulation. You heard for yourself from Dr. Hart that it requires some serious timing. And we’ve never done it before. We never saw how to attach the harnesses or anything. Somebody could get hurt. Really hurt.”

Grace was the voice of reason.

Davey nodded agreement, but the greater part of him *really* wanted to see the g0o. Mostly, he longed to explore the parts of g0o they had only fleetingly acknowledged on their tour with Hart. The Sk8Park. The Lash Court. He was dying to go there.

“I think whoever sends us on this treasure hunt wants us to end up right here. They know what temptation this is!” Viktor argued. “It’s like... invitation!”

“Mr. A would have told us if the g0o was supposed to be a part of this, wouldn’t he?” Davey asked, feeling the prickly sensation of knowing the right answer, even if it was an answer he was not eager to hear. Now two weeks into their school term, Davey’s group had had two day-long sessions with Mr. Andersson. And they’d all found him to be a funny, likeable, if pathologically cheerful fellow. Plus, he was Davey’s guardian, the closest thing he had to a parent on the Halo. So Davey was loathe to disappoint him with a lark that could backfire. Especially if maybe even someone could get hurt, like Grace said. All of which could get Mr. A into trouble, too.

“Yeah, but Davey... maybe this is our GEOcache treasure! Our reward, like, at the end of the exercise?” Jan tried.

“Or it’s another challenge,” Davey offered, taking up Jan’s charge. “To see if we can get into g0o?”

Viktor nodded, seeming to like this prospect.

“I’m quite confident that Mr. Andersson had no intentions of us going into the g0o zone,” Grace asserted.

“No... remember he said the GEOcaching orientation exercise was prepared in Hartland before we left...” Jan reminded. “Maybe they just assumed, of course, that the whole Halo would be fully open. And that, as kids, for sure we would be spending lots of time in the g0o... right? And that if our day ended here, it would be natural for us to then want to go into g0o.”

“Wait a minute... if this was all planned out all those weeks ago, down there like... who hid the treasure caches up here?” Pip seemed confused.

“Probably him. Andersson. I guess, anyway.” Davey added.

“The harnesses are kept in the cupboard over there, remember?” Viktor persisted.

Only Viktor, Grace, Davey and Bhu had been a part of that first virtual tour with Dr. Hart, what seemed like eons, but was merely weeks, ago. The others—Will, Pip and Jan—looked expectantly at them for an answer.

“Yes. There was a cupboard he showed us where the belts were kept. On that far wall,” Bhu said, pointing. Davey wondered if she was just providing the answer because she wanted to be helpful, or if that

meant she was game, too. He smiled at her, and got a sheepish smile in return. *Yep - she wants to go too*, he happily concluded.

Viktor was over there exploring in a flash, joined by Jan and Pip.

"It has a keypad access. You need some sort of code," Jan said, disheartened.

"Davey, come here," Viktor commanded, any effort at tact non-existent.

There was indeed an access keypad. From what Davey could remember from Hart's description during their virtual experience, the keypad should provide access to the harnesses; open the trapdoor above; and send down a lift line to whisk them up into the center of the Halo. Into the zero-g zone.

Above the keypad, there was a long, horizontally rectangular display screen. It lay blank and grey. But when Davey tried one of the keypad keys, the screen blinked to life. Scrolling across the front of the display screen was this message:

H H O I Y O E D D Z L R D E E E E I D R W G V B O

A code? Oh... too tempting! thought Davey. And with the excitement—the challenge—went an end to the consideration.

Deep in reflection, Davey took an ORBITZ candy out of his pocket and popped it into his mouth. He sucked on it, rolling it around in his mouth as he rolled the ideas around in his mind.

"Anybody got something to write with?"

Jan pushed up his sleeve to reveal his ONE. "Don't you use your ONE?" he quipped, as he enabled its 3D projection keyboard. "Go," he said, his hand poised over the ONE, hovering, ready to transcribe Davey's thoughts as he revealed them.

"Nope. Not in the habit of it yet, I guess. Besides, I don't have the 3D keyboard on mine. It's like the 100 model. Anyhow, we'll need pencil and paper, or a Tablet in Stylus mode, for this."

The only one of the group to be carrying her Tablet that day, Bhu reached into her bag. She held the Tablet out to Davey.

Viktor said, "I know what is this. A substitution code."

Davey, careful to be encouraging, nevertheless corrected him. "I would have said so too, except that... well, firstly there are four of the same letter in a row... see? The Es? Four in a row like that—very unlikely you'd find such a thing. Maybe a word ending in a double letter and then the next word starting with the same letter? Okay... that'll get you three in a row. But, the next word starting with another double? Doubt it somehow. Then there's the fact that, with a substitution cipher, you need a corresponding decipher. Unless it was a simple Atabash cipher or something, which those Es also make unlikely. Anyone who wanted to crack it would have to carry the substitution code with them. Very impractical, don't you think, for a

set-up like this? I'd be more inclined to expect it to be self-contained somehow. Also, substitution codes tend to place breaks where the natural word breaks are." Davey could feel he was getting too into this—that, again, that leaky valve was allowing him to spew off more information than was required just to get the job done. *Stick to the facts*, he told himself. "And... err, this one has no word breaks at all," he finished quietly.

"Maybe it's, like, one of those kinds of codes that you have to read, like, only every other letter? That would get rid of some of the E's," Will offered.

"Yeah, but it still makes no sense that way. Unless you again had a substitution and then the decipher is required... blah blah blah."

"So... enlighten us."

"I started thinking about a Caesar box cipher. And when I counted up the number of letters in the code, I was certain we were into something like that. 'Cause, the way Caesar boxes are usually constructed, they are perfect squares. So they have to be made of 4 or 9 or 16, 25, 36, et cetera, letters. Like, 4 times 4, 5 times 5. This one is twenty-five, so it would be a 5-squared box."

He explained to Bhu that, as he read off the letters, he wanted her to create a box: a perfect 5 by 5 box, by the manner in which she laid the letters out. He had her write them from top to bottom, in five-character columns, capturing them in five distinct rows from left to right.

"Then, there will be five of these five-letter rows when we're done. Also five columns. Here... you'll see."

As he recited, she began to transcribe. Once he had shown her what he meant by having her write the first five letters as a column, then create the second column of five directly next to the first, they were off and running.

H	O	L	E	W
H	E	R	E	G
O	D	D	I	V
I	D	E	D	B
Y	Z	E	R	O

"Now, you have to *read* it from left to right instead of from top to bottom like you wrote it." Together, they huddled over Bhu's shoulder.

Viktor was the first to speak up. "I don't see any answer," he said.

"I do," shouted Jan. "Yes... take this down... *hole where God divide*... No, wait... Make that *divided*... *by*... *zero*. Hole where God divided by zero. But, what does that mean?"

Davey looked up and shrugged. That was definitely what the code deciphered to. But what it meant...?

"Hole where God divided by zero. That's a joke," Will said.

"Not very funny," Viktor commented sourly.

"No... it's an old joke. I can't remember who said it. But it's one of my dad's favorites. It goes: *Black holes are where God divided by zero*. Like, what do you get when you divide anything by zero? That old math conundrum: undefined?"

"I get it. That's actually quite funny," Davey said, smiling.

"Well, I think that's silly. Dividing by zero is undefined. Which means it doesn't make sense, and breaks all of math's simplest rules. But a black hole contains a mass equal to millions, and maybe billions, of suns... infinite matter," Grace said, perplexed. "How is a black hole like dividing by zero? Stupid!"

"It's a *joke*, Grace!" Pip added.

Grace glowered. "I know," she muttered. "Wormhole, maybe... it just would have been funnier if it had been more accurate, is all." But she shrugged it off and smiled.

"This is crazy. Like as if anybody could just walk up here and know how to figure this one out... the code box, the clue?" Will observed.

"Errr... I think that's the point, if I'm not mistaken?" Davey replied. "That maybe they don't want it to be accessible to just anyone who wants to try? But if you were *supposed* to be able to access the g0o, maybe you'd have been briefed on how the keypad code was set up. And maybe every old fart scientist would have known the answer, and simultaneously gotten a chuckle out of the clue."

"So, *BLACK* it is," Viktor said, and punched the code into the keypad before anyone had a chance to comment. *They hadn't in fact decided they were going to do this yet, had they?* Davey wondered. But, just like that, it was done.

Jan gasped and stepped back when he saw the console light up, and then they all jolted with the shock of a powerful *clunk* as the locking mechanism on the harness locker disengaged.

"Awesome work, guys!" Pip said ebulliently. "This is going to be sooo cool!"

Before there had been any discussion, dissenting or otherwise, Viktor had himself and Jan secured in harnesses and was getting everyone else loaded into theirs. Davey looked over at Grace with a wordless question hanging in the air between them. It said: *Should we do this, or what?* He hated to think that Grace might be going along because of him—because she didn't want to be the killjoy. Just then, as though in answer, Bhu spoke up.

"Listen, guys. I want to be a part of this just like the next person. Really, I do. But... well, first off, it makes me nervous. And I don't do

nervous very well. At all. And, secondly, what if something does go wrong? Maybe if I stayed here, you know, to kind of keep an eye on things? And make sure nothing bad happens? And if you get into any trouble... over there, I mean..." She looked to the sky. They all followed her gaze with their own eyes. "You can call me on my ONE. At least having someone over here to get help if we need it? I don't know..."

Viktor appeared to be considering this.

"I think that's a great idea," Grace said.

"But we've got to go in twos don't we? At least, that was what Hart explained during the virtual tour," Davey said.

"I agree. So all the more reason I stay behind," she answered, looking at the other six, each in turn.

"Well... one in, all in?" Davey suggested. They all unanimously agreed.

Together, Viktor and Bhu examined the control panel. It had some pretty easy-to-understand markings that explained what made what work. They pressed one button and overhead a large tile, like a huge trapdoor, slid silently open. Through it, a launch line descended every few minutes. By watching a couple of cycles, they established that the rotation of the Halo's perimeter relative to the core was such that each launch line stayed accessible for a good couple minutes at precisely coordinated intervals. Viktor and Jan climbed a ladder up the scaffolding to inspect the process from atop the platform, and reported that the spot where their harnesses would attach to the launch line was plainly evident.

Bhu and Pip felt confident that they had established which button would retract the launch line, pulling the harnessed riders up into the core of the Halo. To go.

And they'd determined that, once attached, they would have to activate the retracting mechanism quickly before the line's allotted time at the trapdoor was up.

"You're so sure you've got this figured out... I suppose you are going to go first?" Grace asked.

"Of course, I go first" was Viktor's arrogant reply. Too much of his father's influence, Davey supposed. "But who will go with me?" he asked, looking around.

"I suppose I seem like the logical choice," Jan offered warily. "I mean, I guess Will and Pip will want to go together... Davey and Grace..."

Davey wondered what made he and Grace an automatic pairing, and then realized he had to accept that most everyone was as aware of their friendship as he was. He looked over at Grace.

"You sure you want to do this?" he asked. She nodded, and gave a

thumbs up.

It was up to Davey to secure Jan and Viktor to the launch line. Then he turned, looked down at the control center from atop the scaffolding, and signaled to Bhu. By the time he could turn back, the boys' legs were disappearing from view through the trapdoor.

Davey and Will looked at each other.

"Wow," was all Will could muster.

"So wow!" was Davey's reply, his gaze fixed again on the empty hole through which Viktor and Jan had just vanished. Davey almost choked on what remained of his ORBITZ candy.

He quickly spat the candy out, grateful he had remembered about it in time. He saw that the hard candy exterior had almost entirely melted away, and he had probably been only seconds away from reaching the candy's gooey center. As tasty as that was, it also contained an outrageous dye that stained the inside of your mouth some hideous color (this one would have been fluorescent orange). Which was fine if you were a little kid and could go around with a bright green smile for twelve hours. The kids in his old school had considered this childish, and had mercilessly taunted anyone over the age of ten whose telltale stained mouth gave away their little secret. He tucked the remains of his candy back in its wrapper and stuck it in his pocket.

Pip and Will went next. By the time it was Davey and Grace's turn, Davey was pretty comfortable with the harness mechanism. He attached both himself and Grace, and shouted "Go!" to Bhu. Without even thinking about it, he grabbed Grace by both hands and together they flew through the ceiling of the Halo's outer ring. Together they shot through the hollow core of a tentacle that reached to them from the button at the centre of the Halo that was the g0o zone.

The feelings of elation, danger, and shared conspiracy all mingled to make a thrill Davey had never encountered—a thrill that even dwarfed (incredibly... impossibly) that awesome space ride up to the Halo in the RLV.

Their speed was impossible to judge in the sensory-deprived chamber that served as an elevator, connecting them to the very center of the space station. Davey had the sense that their trip would be over before his overloaded receptors had the time to make sense of this weird experience. And he was right. Before he knew it, they were approaching a doorway. The system was mechanized to slow gently at the end, ensuring their safe introduction to the center of the Halo. Already the pseudo-gravitational environment of the Halo's outer ring had so diminished that they arrived floating.

Davey unclipped his harness and was the first to go through the door into the g0o zone, though he did not let go of Grace's hand and

pulled her through right behind him. She had this fool grin on her face that said she was as awed by all of this as he was. In some ways, he felt as though they had returned to that virtual world Hart had taken them to, because of the dislocated feeling he had of not quite being inside his own body. He had never felt an experience comparable to zero gravity, ever.

Joining up with the other four, Davey could see that they were all having their own struggles with the zero-g environment.

"I should have had a wee before we left," Pip said. "Nearly wet meself on the way up here," she added with a vivid grin. The others laughed, which served as a welcome release of some of the tension they must all have been feeling.

"Which way to that Lash game?" Will said excitedly. Davey pointed.

Lash was played one on one, in a small, squash-style room with Plexiglas walls, the audience watching from outside. Davey and Viktor, the group decided, would play the first game. From everything they had read describing the game, and from the hologram Hart had played of the crew's Lash game during their virtual tour, they both knew to strap their ankles to a seven-metre tether-like restraint that anchored them to the bottom of the Plexiglas booth, or Lash court. The boys faced each other and laughed at their mutual predicament, floating uncoordinately at the end of their lash. Slowly they began to get a sense of how movements were made to play properly.

To demonstrate the scoring mechanism, Davey gave Viktor the ball and had him throw it toward the wall behind him, into Davey's defense zone, and try to get it into the hole. Because of the lack of gravity, once thrown the ball's path would stay slow but true. A goal would be caught in a sealed net where Davey would recover it to resume play.

"So... we give it a whirl?" Davey asked. "Just remember, you aren't allowed to handle your opponent. Crashing into one another," he said with a cheeky grin, "that's allowable. But no yanking on my tether or holding on to one another. You have to block the shot with what you've got."

Viktor nodded impatiently. "We play now, okay?"

Grace and the other guys hung off the outsides of the Plexiglas walls like flies. Once, when the action approached them unexpectedly, Jan reflexively pushed back to remove himself from Viktor's path, forgetting that the Plexiglas wall stood between them. The rest of the group had a laugh at his expense as he rolled away, bouncing around the g0o's sporting complex. Jan was good-natured enough to join in on the laugh, once he had righted himself.

Grace was enjoying the action between the two players, conscious to not show too much favoritism for Davey. Pip, on the other hand,

didn't hesitate to squeal excitedly each time he scored, or made a skillful maneuver.

Davey, not a natural athlete, nonetheless quickly got the hang of the game's idiosyncrasies. He could see that, played at its best, Lash required bank shots off the court's floors, ceilings and walls in order to get around the goal-tending efforts of your opponent. And the best players—the Space Fleet crew who built the Halo and who had invented the game—had learned a remarkable proficiency of movement in zero-g. They were able to achieve back flips and other maneuvers by straining and then releasing against the lash. A player who could use both of these skills in combination would have a mastery of coming up under, around, and over his or her opponent. Davey yearned to control these weird, aerial flying-type movements that could only be imagined in a zero-g setting.

The two played for a good twenty minutes before Viktor, only willing to let Davey get so far ahead of him, resumed his authoritative air. “We cannot waste too much time playing,” he said. “There is still more of this g0o I want explore.”

From the Lash courts, they went on a tour of g0o. The kids inspected, with generally agreed approval, the Sk8 area. They poked their noses in at some of the accommodation, marveling, sometimes laughing, at the elements of a gravity-adaptable lifestyle that had to be factored in, like straps that held you into bed or (tee hee) a suction tube in the bathroom to pee into.

Davey, like the rest, followed Viktor on this leg of their explorations. Until something twigged, that is, and he realized that in fact they weren't on their way out. That, instead, they were headed into the same out-of-bounds area he and Grace had accidentally come upon while on their virtual tour with Hart. The signage confirmed it, and so he spoke up.

“Viktor? Viktor! We can't go this way.” He pointed to the posted warnings. “Remember, we took a wrong turn this way with Hart, too?” he reminded Grace.

“So? Look at signs!” Viktor said, annoyed. “I know you are thinking to see what's back here since then? Me, I *love* a mystery.”

“This isn't a mystery, Viktor. It's a secure area. And if you remember, Hart made it pretty clear we weren't welcome there.” Davey had desperately wanted to ask Hart what the area contained at the time, but hadn't had the nerve to ask. And he had never presumed upon Grace to find out, either, feeling that would be like asking her to take advantage of her parents' privileged positions. So, yes... he'd also been dying to see what was back here.

Given that g0o was supposed to be closed to Colonists, the area obviously didn't have its security features fully enabled. So when

Viktor shoved open a set of double steel doors and headed straight through, Davey dragged up the rear. As Grace crossed over through the doors, she gave him a shrug that said *whatever* and he felt a little better about continuing through himself. If she didn't think accessing a restricted area was that big a deal, who was he to object?

Davey caught up to the rest of them, and nearly knocked into Grace as the whole group had come to a sudden stop by bracing themselves against the walls. The area—what looked like a set of exterior, man-trap doorways, like those he had seen going out to the unpressurized, robot-inhabited Space Elevator construction zone—appeared to have been vandalized. Some sort of crowbar or heavy instrument had been taken to a control panel in what appeared to have been an effort to force open a key access. Davey looked closely at the keyhole, and a shiver ran through him. It was oddly shaped—more rounded than a traditional keyhole.

Instinctively, he felt in his pocket. His fingers found the key that had been presented to him in that coded steel box he'd opened back in pre-flight screening. The one he had believed, then, to have secured his spot in Zero Colony. He remembered its tag's message: *welcome aboard*. At first he'd presumed it to have been a key to his home at Hartland for pre-flight (not). Then he'd expected it to be the key to his home on the Halo (neither). He had since taken to carrying it around with him, sort of as a good luck charm, given that it had no other immediate and obvious use. At that moment, he knew in his heart what the key was meant for. He didn't need to slip it out of his pocket to confirm it. So he didn't.

18: SO, WHO WOULD *U* TRUST WITH UR LIFE?

Life is what happens to you while you're busy making other plans.

*John Lennon: (British) Pop legend, icon and voice of a generation
Beautiful Boy (Darling Boy)*

What had started out as perhaps a misguided adventure into the g0o zone, had been punctuated by the unexpected discovery of what might be considered vandalism. Vandalism would of course be the generous interpretation. Sabotage would be the more realistic inference, given how important this area appeared to be.

Safely back on the outer ring of the Halo, the kids took up their usual big booth at the SpaceBar—the Halo's only functioning coffee shop and their de facto hangout. Sipping sodas, they speculated for a while about what this vandalism might mean. But none of their explanations made any sense. Someone suggested that maybe the Space Fleet crew who built the Halo did it. But nobody could come up with a good reason why. Until Jan cracked a joke that maybe they had locked their keys on the other side!

"So, what are we going to do about it?"

"What can we do? We have to tell someone. Your dad, I guess," Davey offered to Viktor, in the absence of anyone wanting to wade into the discussion.

"No way, we can NOT tell my father!" Viktor insisted. No debate.

"I think I agree, Davey," Grace chipped in. "At least, I think we need to consider other options. Commander Gurov would pitch a fit if he found out we'd been in the g0o without authorization or supervision.... oh, God we are so in for it," she moaned.

Davey was surprised at Grace's reaction. *Would she really want to cover this up?* He was confused as well by her fear of Gurov's (and hence, he assumed, her own parents') reaction. Grace would have been the first to admit that she had, when it came to her parents, a bit of the rebel in her. He knew that was a big part of the statement she was making with her clothes and hair. And she'd even confessed to him once that her parents' response was at least a small part of the

attraction in her decision to become a vegetarian. “Drives them crazy,” she had confessed to him with an impish grin.

“Sorry, but I agree with Davey,” Will offered, and Pip nodded her assent. “We should tell.”

Davey nodded. “Look, we may get in trouble for being somewhere we weren’t supposed to be. But the truth is, we know something that could be really important. That was a secured area that someone apparently really wanted into. That we may wind up in a heap of doo as a result of having been there... well, I just don’t think that can be the priority.”

“My father will KILL me, Davey...”

Not for the first time Davey actually felt some kind of compassion for Viktor, and again it surprised him. He looked at Grace. She seemed miserable, too.

“Well, what if we go to Mr. Andersson? Tell him what happened? Maybe there is some way he can, you know, sort this out without necessarily putting our necks on the line?” Bhu offered.

“Yeah? I bet Mr. A would help,” Davey agreed.

“That’s it, then? Let’s talk to Mr. A,” they agreed. Davey would do the deed. As Mr. A’s charge, he had a more personal relationship with him than the rest of the kids.

They spent some time planning how and when Davey would speak to Mr. Andersson, and what he would say. Then the topic turned back to just what it was, exactly, they had uncovered in that secure area of g0o. Will immediately advanced the conspiracy theory, linking this event to the failed RLV landing. He was labeled as having a hyperactive imagination, and the conversation drifted to the lashing Davey had given a sullen Viktor.

Mr. Andersson, a bachelor, was in residence in a cluster of what looked like small town homes at the far end of Davey’s block. Working in Comms, Grace had access to every Colonist’s ONE address. She sent the teacher a message on his ONE that afternoon, telling Mr. Andersson that Davey needed to see him, to speak with him, regarding something that had happened while on their assignment. And that it was of dire urgency.

Mr. Andersson suggested that they meet at his home at five o’clock.

Davey knocked with great trepidation. Despite having discussed the content of this confession with his fellow confessors—conspicuous, now, by their absence—he felt nervous and uncertain. Not so much about the confession of what they had found, which he knew he still didn’t fully appreciate the potential meaning of, but knowing that revealing it would require confessing that they had been in a restricted area.

But Mr. Andersson was surprisingly genial about it. While he was careful to express his disappointment in their lapse in judgment, he emphasized that he was first and foremost relieved that no one had been hurt in the process.

Mr. A told Davey he felt somewhat responsible for having given the kids an exercise that had landed them at the entrance to g0o, thus having precipitated the whole thing. And seemed genuinely concerned about the evidence of tampering or sabotage or vandalism, or whatever it was, that the kids had uncovered.

And so, a deal was struck: Mr. Andersson would dole out a punishment for the kids himself as payback for their foolhardy behavior. Davey was told to let the others know, in no uncertain terms, that they could expect it to be both severe and enriching—meaning, Davey assumed, that he was going to make them pay it back in academic sweat. And Mr. A himself would deal with the grown-up implications of the g0o discovery, and would do his best to keep the kids out of it.

Davey left feeling grateful, relieved and eager to tell his friends about their success.

On their way to school the next morning, Grace shared in his relief. She was a little surprised that Mr. Andersson had committed to keeping their escapades just between them, for the time being at any rate. This was more than she had dared to even hope for, she told him, and Davey agreed.

That night, Mr. A would go to Gurov himself, they'd assess the situation, and involve the proper HART Corporation authorities back home. Grace raised her eyebrows. "Really? He's going to do that for us. Act as, like a shield between us and the Commander?"

Davey nodded. "Yep. I guess he kind of feels responsible for me, and for having effectively dropped us at the entrance to g0o with no further explanation." It was more than either of them might have hoped for.

At school, the group was sitting in their usual cluster of chairs. All thirty-one kids had arrived and were milling about or chatting or doing some school work, waiting. Davey and the gang were quietly discussing what a great guy Mr. Andersson was, when the door to the Learning Centre opened. Davey shot a quick glance at his chrono, fully expecting Mr. Andersson, who was already more than twenty minutes late, to emerge from the doorway. Instead, to everyone's surprise, Commander Gurov entered the room. All eyes seemed immediately to shoot to Viktor, whose squirm was discernible to even the untrained eye.

Commander Gurov was brief. He told the kids that their teacher would not be coming in that morning. That they should work or read silently until a replacement teacher, who had been called, could join them. Gurov then said, "Please, when I call your name, I would like you to collect all of your belongings. You won't be returning to class today."

Viktor blanched, and Davey felt as though the floor had fallen out beneath his legs. Gurov began calling out the names of the members of their group. And one by one, beginning with his own son, Commander Gurov, in stark and humorless tones, invited each of the little gang to the front of the Learning Centre. All, that is, except for Davey.

Viktor looked totally ill. Grace looked down at her feet. And Jan looked behind at Davey as he was preparing to join the rest at the front of the class. His look so clearly said "*Why not you?*" Davey could only shrug, feeling sick that he wasn't among his co-conspirators, and sicker still that he had no rational answer as to why.

No question: Their trip to the g0o zone had been discovered. Had Mr. Andersson had a change of heart? Had he decided to provide the commander—Viktor's father—with the details of their misadventures, forgetting the discretion he had promised Davey? But where, then, was Mr. Andersson? And why had the kids been told not to expect him today?

Davey got a few non-answers later that afternoon in an audio only VIDphone call with Grace. On the Halo, the Colonists' video feeds from their VIDphones had been disconnected. All of the Colonists' images were under license to HART Corporation, as a part of the very long and complex contract everyone on the Halo had had to sign. So every Colonist's personal image was effectively owned by HART Corporation and reserved for HART's commercial and promotional use. Their images were very closely restricted and regulated as a result. Even their Instant Message profiles had no pics attached.

Grace's parents hadn't come home from work yet. But she was, quite frankly, preparing for the smelly unmentionables to hit the fan. Commander Gurov had taken the kids, all at the same time, into a room and interviewed them. There had been three other people in the room with him, none of whom Grace knew, and they hadn't been introduced.

Simply, Gurov knew about them having been in g0o. But none of the kids confessed to seeing the secure area or to having told Mr. Andersson about it, mostly because Gurov never asked. And they were too frightened to do more than answer the questions put to them.

They all had stuck pretty much to the same story: They had interpreted the fact that the GEOcaching had ended there, and that

there was a coded keypad, as a challenge or a part of their assignment. And that they'd eagerly gone to the g0o, once they'd decoded the panel, because they'd been dying to see the Lash game. The end.

It had been a pretty lame interrogation by Grace's estimation, and she scoffed at their tactics.

"Whatever happened to '*Divide and Conquer?*' I mean, they obviously knew we'd been in the g0o. Why be satisfied to learn nothing more than that?"

"And most importantly, they gave you no indication that Mr. A had given you guys up?" Davey added.

But Davey and Grace couldn't figure out how Gurov and company, if Mr. Andersson had remained true to his word, could have figured out that the kids had indeed been to g0o without permission. Grace said she was pretty sure from her work in Comms that there was no systematic monitoring of the Halo's video surveillance or security systems. They just didn't have the manpower. And that the g0o zone wasn't wired for video and sound, the way the Halo proper was.

Not to mention, where was Davey on the list of suspects? No matter what intelligence they'd used to uncover their g0o trip, why was Davey not implicated like the rest of the kids?

Later that afternoon, Davey was playing his favorite OMNI game when his computer pinged the arrival of an Instant Message. Without profile pics, Davey had no idea who was pinging him until he opened a conversation box to answer.

At that very moment, Grace was sitting at her own computer, her wireless headset feeding her favorite music play list directly to her ears. Her head bobbed slightly in response to the music as she typed a chat message for Davey:

...G®ÅÇë...iÑ...\$pÅ¢£...

u there

««ÐäYËY ...ÐØÑ± ...ÐİŠ©°»»

whats up

...G®ÅÇë...iÑ...\$pÅ¢£...

not much – u

««ÐäYËY ...ÐØÑ± ...ÐİŠ©°»»

nada can u come over

...G®ÅÇë...iÑ...\$pÅ¢£...

that's a nope – in lockdown – all of us are, for rest of this week – gurov says so

Davey felt terrible being the only one who had escaped punishment for their trip to goo.

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

sorry u r stuck at home

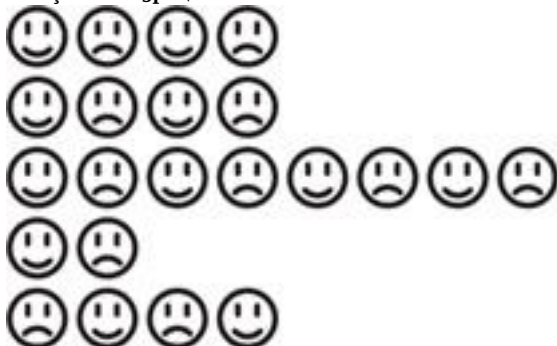
...G®ẢÇỀ...iÑ...\$pẢ¢£...

no big - am trying to get some emoticons loaded right now – they are misbehaving having trouble yanking them from omni so i can load them into my profile

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

for emoticons that you use in messaging friends... u can use those in ur profile too i think

...G®ẢÇỀ...iÑ...\$pẢ¢£...



...G®ẢÇỀ...iÑ...\$pẢ¢£...

whoa emoticon overload

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

lol u r 2 funny

...G®ẢÇỀ...iÑ...\$pẢ¢£...

silly or funny... hey u know viktor sez u ratted

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

thats bosh

...G®ẢÇỀ...iÑ...\$pẢ¢£...

i know

He steeled himself to ask the hard question.

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

what about everyone else – do they dwid viktor

...G®ẢÇỀ...iÑ...\$pẢ¢£...

uggg – whod want to do what he do – dont sweat ok

««ĐăŸĚŸ ...ĐØŇ± ...ĐİŠ©°»»

k

...G®ÅÇë...îÑ...\$pÅ¢£...

what gives tho. y us not u

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

cant think how they knew + y u r nabbed and not me

...G®ÅÇë...îÑ...\$pÅ¢£...

thats the problem

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

not bcs i told – so y not me

...G®ÅÇë...îÑ...\$pÅ¢£...

someone saw maybe

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

i was there 2

...G®ÅÇë...îÑ...\$pÅ¢£...

i know – y us not u

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

tracked us maybe

...G®ÅÇë...îÑ...\$pÅ¢£...

again - y not u

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

what is different about me

What isn't? Davey thought as he typed.

...G®ÅÇë...îÑ...\$pÅ¢£...

nothing

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

has 2 b

...G®ÅÇë...îÑ...\$pÅ¢£...

what would track us – id us

««ĐăỲỄỲ ...ĐØÑ± ...ĐỈŠ©°»»

some sensor or transmitter something – do u all have wirehead implants

...G®ÅÇë...îÑ...\$pÅ¢£...

no just me + bhu i think... mom calling brb ok



A kiss? Did she mean it as a kiss? Or was she just having more emoticon control problems? But, really: a glitch... or a kiss? He didn't know which, but the tickle at the nape of his neck told him he might

want to think about finding out. Sometime.

Davey waited impatiently while Grace answered her mother's call. Her *be right back* turned into a prolonged pause, and Davey quickly grew bored with waiting for her.

This was the kind of time in his day, while Davey sat at his computer, that his beloved cat Bitzy (gosh, how he missed him) would invariably find his lap. And while he was working, gaming, or bouncing between convo boxes chatting with his school friends — something he did less and less in the months since leaving Rednersville—he would stroke his soft ears. He had this one little spot, just below and behind his earlobe (if cats had something like earlobes) that was so soft.

Thinking about Bitzy made his heart ache.

He checked to see if his grandparents were online. He'd set them up with identities and taught them the basics of Instant Messaging before he left home. He hoped that they would be online now so he could ask them to hold Bitzy up to the OMNIcon for him, as they'd done a couple of times in the past few weeks. But nobody was there.

As though she sensed his longing, LooAnne began nuzzling against the side of his leg. When he reached down to offer her a little tickle behind the ears, she hopped up onto his lap. He looked at her with sad eyes.

"I'm sorry, cat. You're no Bitzy, girl. I can't help it – I just miss *him*."

LooAnne tipped her head from one side to the other, as though puzzling over his words. She began to nuzzle his chest and purr her loud metallic purr, and he laughed in spite of himself.

"Okay, okay. I know you're doing your best," he told her, and patted her some more, which resulted in a louder purr. Davey tried to move her off of his knee, but LooAnne was having none of it. Eventually, he relented and allowed her to curl up on his lap, which she did like a real cat, working her paws as she spun and searched for just the right spot to lie down. He resumed his game play, knowing that Grace would ping him when she came back. He wasn't sure how much time had elapsed, but it seemed like a good half hour or more, when his computer chimed Grace's return.

When he wiggled a finger on the pad to awaken their convo box, he was shocked to read the message it contained.

...G@ÅÇë...iÑ...\$pÅ¢£...

horrible news mr a dead – dad says they found him in his home this morning

««ĐăŸËŸ ...ĐØÑ± ...ĐİŠ©°»»

omg

...G@ÅÇë...iÑ...\$pÅ¢£...

i know

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

did ur dad say what happened

...G®ǺÇĕ...iŇ...\$pǺ¢£...

they think accident

dead since yesterday dad wont say more

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

grace first we tell him about g0o and this morning hes dead

...G®ǺÇĕ...iŇ...\$pǺ¢£...

im sick

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

accident? do you believe it

...G®ǺÇĕ...iŇ...\$pǺ¢£...

dad should know

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

i know grace but after what we found?

do u really think?

...G®ǺÇĕ...iŇ...\$pǺ¢£...

what – – that someone killed him

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

because of what we saw

what we told him

...G®ǺÇĕ...iŇ...\$pǺ¢£...

viktor just pinged me brb

Davey sat anxiously perched at his keyboard this time, waiting for—even willing—the next message from Grace to appear in their convo box. In just a few minutes, Grace came back with a ping.

...G®ǺÇĕ...iŇ...\$pǺ¢£...

wants u 2 chat too

me him bhu will pip

link to this omni.chat.private.groupa722 pass: halokid

««ĐǻŸĚŸ ...ĐǾŇ ± ...ĐĪŠ©°»»

c u there

...G®ǺÇĕ...iŇ...\$pǺ¢£...

buh bye

Davey followed the link to a private chat room, where the conversation had already begun between Viktor and Bhuvana. He

could also see that Will and Pip seemed to be logged in together. He scrolled up and read a bit of their conversation to catch up. Seemed they were talking about the very same stuff he and Grace had been discussing, only Viktor hadn't let go of the premise that

Davey had somehow ratted them out. Grace, apparently, had yet to wade into the conversation with news of Mr. Andersson.

Viktor, noticing that Davey and Grace were now logged into their session, put down the video camera he had been fiddling with and got straight to business.

««vIKtoR GurOv »»

what is going on

Davey knew enough to know the question was directed at him.

««ĐăŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

hullo

wheres jan

««vIKtoR GurOv »»

hello

offline

what happened

««ĐăŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

of course u know ur guess is as good as mine

listen

grace has news

...G®ÅÇĕ...îŃ...\$pÅ¢£...

brace urslvs

...G®ÅÇĕ...îŃ...\$pÅ¢£...

mr a is dead

Grace went on to explain the circumstances as her father had explained them. And the coincidence that Mr. Andersson had died after learning about their trip to g0o was not lost on the kids. The conversation turned to questions of how they might have been found out. The general assumption was that Mr. Andersson, based on the best indication Grace could get on the timing of his death, had not ratted them out. Because he was already dead by the time Gurov senior had said he'd learned of their trip to g0o.

So how had they been found out? All except Davey that is, as Viktor was eager to remind.

And, how much of all of this had something to do with what they had stumbled upon? Did it mean that, with what had happened to Mr.

Andersson, they might now also be in danger?

The questions quickly got ahead of any kind of answers that might be forthcoming. In fact, it seemed as though there were no answers, only questions. The conversation quickly went spiraling into concerns and conspiracy theories. Will, always eager to imagine an adult-orchestrated scheme of questionable intentions, abandoned the HOLOsoccer game he'd simultaneously been playing while Pip typed. He sat hunched over his computer, sweat dripping from tendrils of hair on his forehead, he logged in and joined in the conversation for himself. Over Will's shoulder, a goalie made of digitized light frantically patrolled his net, awaiting the next shot from Will that would not be coming for a bit. Will typed:

ööMÄñ...Ü...Rü£ëšöö

i know u guys think i'm bosh, but HOW HOW HOW did they know we went to g0o

...G®ÄÇë...iÑ...\$pÄ££...

davey was wondering transmitter

Bhu had abandoned her Tablet, mid-homework. Like the others, she was intent on getting some kind of understanding of these latest, and very disturbing, revelations. She probed further, needing some kind of rational explanation.

...Ð®ëÄmŽ...

how do you mean transmitter

««ÐäYËY ...ÐØÑ± ...ÐİŠ©°»»

we were trying to understand y not me

not that i wasnt seen but i wasnt picked up or something

...Ð®ëÄmŽ...

like there is some kind of monitoring system

ööMÄñ...Ü...Rü£ëšöö

guess i dont sound so wonked now hey

...G®ÄÇë...iÑ...\$pÄ££...

davey thot maybe wirehead implants but they rcv only no signal

im pretty sure

««ÐäYËY ...ÐØÑ± ...ÐİŠ©°»»

its the ones then

it must be

they are using the ones to track us

««vIKtoR GurOv »»

which should have included you

you have one too

Davey hesitated for a moment, and then typed:

««ĐǎŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

i have one

dont use it tho

...G®ǺÇĕ...îÑ...\$pǺ¢£...

u dont carry it

««ĐǎŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

nope

cant seem to make friends with it

ööMǺñ...Ŭ...Rü£ë§öö

holy #\$\$@^

...G®ǺÇĕ...îÑ...\$pǺ¢£...

yah

««ĐǎŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

i know

There were still more questions than answers.

But one answer did seem simple enough to all of them. They were clearly on their own now. They all agreed: Until they had some sense of what had happened to Mr. Andersson, and what might have happened in the g0o's restricted area, they simply couldn't risk bringing anyone else into their confidence. Both for fear of their own safety, and the safety of anyone they might tell.

Their best hope at this point was that, between Grace and Viktor, they would hear when the grown-ups had sorted through this mess. But until then, where they had been, and what they had seen, was information they would not share with another soul until they figured out what it had to do with Mr. A's death and who they could and couldn't trust with these revelations.

But if the parents weren't able to sort this mess out—Will insisted and the others accepted—they had some kind of obligation to find out what had gone on out there in g0o. How they might do so carefully, trying to mask their movements, was unclear to them all.

Another window pinged open on Davey's desktop. He clicked on it, wondering if it might be his granddad. It was his mother.

7Ÿ The mother of ascensionŸ7

Hi honey!

IMing him was her new kick at being hip mom. He hesitated for a

moment, worrying about what he was going to have to tell her, and clicked over to his chat with the gang and typed:

««ĐǻŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

gtg its my mom!

Back to his mother now...

««ĐǻŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

mom!!!!

7Ÿ The mother of ascension Ÿ7

Hi kiddo how are you?

««ĐǻŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

good doing homework

7Ÿ The mother of ascension Ÿ7

We chat later?

««ĐǻŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

would that be ok? pretty swamped

7Ÿ The mother of ascension Ÿ7

Are you eating properly?

««ĐǻŸĚŸ ...ĐØŃ± ...ĐİŠ©°»»

got a microwave dinner just pinged!

7Ÿ The mother of ascension Ÿ7

Okay. IM me back in an hour then. I love you xo

Davey didn't bother with a reply. Just as he was closing the window down, he heard another ping. His mother again, he presumed. He clicked open the window and had begun typing *hello again*, when he realized it wasn't from his mom. It was from some profile he did not recognize.

ÖÖ Ÿ ÖÖ

2 mEet me

ÖÖ Ÿ ÖÖ

2 C me

ÖÖ Ÿ ÖÖ

2 E C

ÖÖ Ÿ ÖÖ

u need 2

ÖÖ Ÿ ÖÖ



What the heck was that all about? Before he could backspace and re-key his reply (which was going to be: *Who are you?*) they were gone. Ping. He was left staring at the open window of text.

He copied the content of the IM and flung it over onto a Tablet note pad page, and logged off.

As he put a microwave dinner into the oven he was interrupted by the appearance of Commander Gurov at the door.

“Commander!”

A nod.

“Ummm, is there something you need?” Davey finally asked.

“You’re on house arrest, you and the other kids, for the rest of the week,” was all he said.

One look at the commander’s face and he knew not to bother pleading innocence.

He went back to his dinner, but had lost his appetite completely.

“Viktor...” he muttered through pinched lips, shaking his head. *Had he just wanted to make sure Davey got in trouble too? Or what else had he confessed to his father?* he wondered.

Now he was surely going to have to reveal all to his mom.

19: A 2D WHIRL IN A 3D WORLD

Don't underestimate the Force

Darth Vader: As voiced by James Earl Jones, in George Lucas's Star Wars

“What do you think this is all about?” he asked, pulling up the note from his Tablet for Grace to see.

“Depends, I guess. Where'd you get it?”

“The other day. After we group chatted. Someone sent it to me in IM.”

“Someone? *Who* someone?”

“That's just it... I have no idea,” Davey answered, tickling LooAnne, who had just jumped into his lap.

“How would they have your address then?”

“I guess anyone who wanted it bad enough... these days?”

“True,” Grace conceded.

“And they were gone before I could ask. Then, when I checked who had me listed in their contacts, there was nobody there I didn't know. And that profile, it wasn't listed.”

“Weird,” Grace pronounced.

“*Too* weird!” He smiled at her. Then remembered the fluorescent green stain of his lips, tongue and gums and sheepishly tucked his grin away. When they had IM'd that morning, their first morning of renewed freedom, and he had told Grace he wanted to show her something, he had forgotten until he was already on his way over there that he had eaten an ORBITZ. To its gooey, colorful core (flavor: *slimeball*). And his mouth would remain an unmistakable, living color testament to that fact for another eleven hours still! He had been so embarrassed when she'd arrived at the door that he'd tried to say *Hi* with his mouth tightly drawn. But then she'd smiled her trademark perfect grin at him and had asked, casually, if he had any more ORBITZ to share with her.

Grace grinned back now, her techno-purple lips and gums flashing evidence of her very own encounter with a *mondo-violeto* ORBITZ.

Davey handed his computer over to Grace, who laid it out on her desktop. She dove into it with an ease and effortlessness that bordered on shocking.

“Well, there’s nothing in your own system logs that’ll help us. I was hoping that, if they used a backdoor into your communications settings, they left a footprint.” She maneuvered around his system some more, shaking her head and muttering. “Nope. I’m going to log into the Comms system on-board. It might be able to tell me who slipped that IM over to you. At least, it will tell me who was logged on at the time. Though it’s possible it was sent from Earth, in which case, the trail could run cold pretty quickly.”

She hammered away at the keys reflexively, her brow knotted in concentration and her shoulders slightly hunched, as though she were slowly melding with the computer. “Well, here’s something... though it’s not really much of anything,” she offered, pointing to the screen. “Looks like that message was on a time-delay relay. It could have been logged into the system from anywhere, at any time. But its envelope was secured, so inaccessible, until the appointed delivery date. Looks like they found you by posting it to your IDentacard number and syncing that with the Halo’s crew directory. So, you were right. Pretty much anyone—well, anyone clever—could have found your IM address to send it. And from anywhere... and I guess at any time. Bet that was really cacking helpful, wasn’t it?” she said laughing.

“They had my IDentacard number, then?”

“Hmm... think so, yeah.”

Davey looked pensive.

“So...”

“Someone wants me to meet them,” he blurted.

“Yeah... looks like. But who? And where, even?”

Yeah, and why? Davey wondered. And *when?* So many questions. And then, the spontaneous memory of feeling this same way in his haunting recurring dream sent a shiver up his spine. *What was that all about?* he wondered, but had to let the thought slip aside in aid of finding an answer to this more immediate question.

“I’ve been thinking about it... the message. To meet me... to see me... to EC?”

“Think it could be saying ‘too easy?’” Grace offered.

“Yeah! Yeah, I like that. Too easy! To meet me, to see me, too easy, you need to be me...” Davey read from memory, incorporating Grace’s contribution. “So, what was with those bolded characters?”

“Dunno,” she said, shrugging.

“In bold caps... **2 E C**... Why in bold?” he persisted.

“All the better to draw your attention to them, my dearie,” she said, in imitation of the wolfish-grandma’s explanations to Little Red.

“Yep. To make sure they stand out. And not just because of the ‘too easy’... **2 E C**. And then those lips... *what* is up with that?”

“Kisses? Seems odd doesn’t it?”

Davey thought for a moment about the kiss she had attached (mistakenly?) to their very own correspondence the other day. And wanted to ask her about it. If only he knew how, that was.

“2-E-C-kisses... or 2-E-C-lips... 2-E-C-lips... 2 e-clips? Could it be saying 2 e-clips?”

“Uhhh, yah... I guess... but why?”

“My mother. My birthday,” he mumbled.

“For goodness sake, Davey. Would you spit it out?”

“My mother... a few weeks ago, when we were still at Hartland, my mom gave me these two e-clips. For my birthday...”

“Heeey... I didn’t know you had a birthday while we were at pre-flight! How come you didn’t tell me?” She gave him a look of mock indignation.

Davey just shrugged. “Sorry. It was actually on launch day. My mom gave me the e-clips a day early, when she found out I was going without her. Anyhow, I figured I didn’t need to say anything about it being my birthday, seeing as how I was already getting the biggest birthday present, like, EVER!” They both laughed.

“Seriously, though. Next year, okay?”

He nodded. “But look... those e-clips... my dad left them for me. Purposefully. With the intention that they be given to me right now, when I turn thirteen.” He saw that Grace immediately understood completely. “Yeah... it’s about the only thing I have of him. And so I have to ask myself *Why?* Why now? And then this message... I just don’t know what to make of it. But somehow, something tells me it all fits together.

“My mother told me some stuff. Umm... stuff that I don’t really understand. Even my mom doesn’t really understand. It’s complicated,” he said, shrugging. He didn’t want Grace to think he was being evasive again, like he had been by not sharing his birthday with her. But he *was* being evasive. And now he better understood his mother’s choice to say nothing about his dad until she could say something good herself. “Thing is... I *know* this all fits together. Except, I don’t know how. Like, there’s no way I’m going to be able to get the big picture ’cause I still have too many pieces missing. Does that make any sense at all?” he asked, plaintively.

“Of course. Sure...” But Grace was distracted, thinking. “Have you checked out what’s on the e-clips? Wait... of course you have, what am I saying?”

“I did. Right away as soon as I got ’em. But it’s in a file format I have never seen. There’s no software that I know of to open it. And believe me, I looked. In fact, it looks to me like it isn’t so much a file but a crypt... An electronic vessel that holds the real file enclosed: encrypted. And you have to know how to open the crypt before you

can even get to the file. The best way I can think of to describe it... Do you play Light Bender?" But before Grace could answer, "No, what am I saying," he laughed. "Do you play Light Bender? Yah, right!"

"Okay, now! No, I've never even seen Light Bender, okay, but there's no reason to be so smug," she scolded gently. "What about it?"

"Well, in the game, they give you some treasure, in this instance like an electronic file. And you have to carry it with you, in this crypt thing. So you can't use it, and maybe it's even a liability to carry it around." Davey considered that for a moment. He hadn't thought quite along these lines before.

"Yeah?... Davey?... You were saying? Something about the crypt?"

"Yeah. You have to carry it, until you get somewhere else in the game where you earn the way to decrypt it. Only, this isn't a game, and I don't know where to go..." he said, frustrated.

Grace considered this for a moment as they both sat in silence.

"Why didn't you tell me about these before? I'm kinda pretty good at computer stuff you know?"

"I know, I'm sorry! I just got them from my mom like the day before we launched."

"So, you say you don't know where to go? Where? Is that how these crypts work? You have to get somewhere?"

"Pretty much. Sometimes there can be a challenge when you get there, first."

"Where could this somebody want you to go to meet them, to see them?" Grace asked.

"To meet me, to see me...if the e-clips come from my dad, and he's not up here... well, at least as far as I know... I mean, as far as I think I know," he added plaintively. "How on Earth could I go somewhere to meet him... unless—"

"Grace? Gracey..." Grace's mother's voice interrupted, calling to her from the living room.

Grace pulled a face, unhappy for the disruption, as she answered her mother, "Yes?"

"I've got your grandparents on in here. Come in and say a quick hello, would you, before I let them go?"

Grace perked up a bit with the thought of speaking with her grandparents. "Hold that thought, okay? I'll just be a sec. Wait for me?" she said as she stood to leave.

Davey picked up his computer, saying, "I've got something I want to check out. Meet me after?"

Grace shrugged. "But I'm only gonna be a few minutes," she pleaded.

As they walked out into the living room, Davey was stopped in his tracks by the shocking sight of Grace's mother, sitting in a living room

armchair, in the middle of a full-on conversation with Grace's grandparents. Not just chatting with them, mind you.

They were *THERE!* Right there—her grandparents—sitting in the middle of Grace's living room!

"I'm just going to walk Davey out, Mom," Grace said, and her mother nodded that she had heard.

"Hi Grandma and Grandpa," she added, "I'll be there in just a sec."

"Okay, darling," a stunned Davey heard the grandmother reply. But the truth was beginning to sink in.

Davey could hardly take his eyes off Grace's mother and her grandparents, and stood watching them interact for a brief few moments. "That is sooo cool!" he whispered to her at last. "I've heard about 'em... just never seen one."

"What? Oh, the HOLOphone, you mean? Yeah. Makes being away a little easier, I guess."

Davey guessed it would, too. But setting up a HOLOphone was just so incredibly expensive. Having to have each of your callers' images captured and digitized in advance, not to mention the array of motion capture cameras that were required on the other end to collect and record their movements during each conversation; plus the software that melded their real time action with the stored digitized image, plus the holographic projector required to recreate them on the other end. He would love to be able to HOLOphone with his mother but would have to settle for voice and a two-dimensional OMNIcon image of her for now.

"It must be nice to get to sort of be with your grandparents like this, hunh?"

"Yeah. Only, my grandma wishes we could beam ourselves back to them. I mean, I kind of understand why HART Corporation's rules are so tight about the use of our images and stuff, but you'd think... no? For family?"

Davey nodded. Good old HART Corporation.

"And, I've gotta tell you, it is a bit weird that my grandparents are always wearing the same clothes and stuff! But my grandma likes it 'cause she says she won't age a day while we're away!"

They laughed a little at this, and Grace walked Davey to the door.

"Oh my gosh, Grace!" he exclaimed, struck by an epiphany as they reached her front door.

"OMG what?" she said, facetiously.

"My dad gave me that HOLOphoto too! Don't you see? He couldn't possibly have known I'd see my mother's copy some time in the future. He wanted me to have that picture!"

"OK...?"

"There's only one way to meet and see someone who isn't there,"

Davey said, feeling sick to his stomach with the implications of this possibility.

“Go get your e-clips. I’ll meet you at the HOLOcade when I’m done,” was all Grace needed to say in reply.

Davey stood anxiously on the foot-positioning markings inside the HOLOdome. Like for the rest of the kids, this was already a comfortable hangout for him. The Halo had a most advanced, state-of-the-art HOLOcade. With all the hottest, slickest connectivity gear: Virtual Reality suit, footpad, eye-flick interface... you name it.

He tugged on his VR suit. It was meant to be a tight fit in order for it to be able to interact with his body, and to trick his senses. It was a big part of what made these immersive virtual reality games so great. But Davey hated the snug fit nonetheless.

The body-hugging fit ensured that all of the millions of tiny electrical impulses the suit emitted properly stimulated the wearer. These impulses could simulate the elements like wind and rain, or even the touch of another player or object, in the virtual world the HOLOdome expertly recreated. Being inside the virtual environment created by the HOLOdome was like being inside a totally immersive, deady accurate representation of the real world, so realistic were the sensory inputs the connectivity gear could create. Sights and sounds, sure... but this place could create virtual smells and sensations too!

And, most importantly, it was the kind of high-tech light show that could reconstruct, on its two dimensional surface, a thoroughly precise 3D rendering of real objects. Looking at them from anywhere inside the HOLOdome gave you a slightly different perspective on the 3D image, making it look whole and complete. And in there with you.

“You ready?” Grace asked.

Davey secured the goggles on his head and put the helmet on. “Yeah,” he answered.

Grace took the first of the e-clips and plugged it into the HOLOdome’s USB interface. They waited. Nothing.

“You getting anything in there?” she asked.

“Nope.”

“Screen’s a blank here too. Want me to try the other one?”

“Okay.”

Immediately the screen blinked to life. DECRYPTION IN PROGRESS it flashed. “It’s working... at least, it’s doing something.”

“Oh, God,” said Davey, nervous beyond all measure.

“It’s asking for you to enter some stuff... it wants your name. Want me to put Davey or David?”

“David, I suppose.”

“And what’s your IDentacard number? It wants to know. You can

tell me now 'cause I already know your birth date, you miserable sneak!"

He laughed, and was grateful for the momentary break in the tension. He told her the number.

"Wait... nope. It gave me an error. I don't get it."

Davey found himself swaying on the spot a little. This was all too woozy-making. Too surreal. He thought of the HOLOphoto. And why his dad might have included it in his gift, along with the e-clips. Was it just as a hint that the e-clips contained a HOLO? Or was there something else that the HOLOphoto was meant to convey?

"Try again. With David Randolph," he said. "But put this IDentacard in instead..." He gave her the same sequence of numbers: a series of digits that identified his family tree (the Randolphs of Southern California), and so the same as his; followed by the birth date of his father, after whom he'd been named.

No sooner had Grace keyed in the dates than his holographic world blinked immediately to life. The light was blinding, and totally unexpected. He squinted to recapture his senses.

Then Davey went rigid with the sight. A man he knew must be his father appeared before his eyes, á la *Star Wars*' Princess Leia. Davey was instantly filled with a mixture of longing and regret. He felt a sudden wetness pooling where the goggles met his cheeks, and he realized that he must be crying. But the e-clip was an old technology, and it had a limited storage capacity. He felt as though his father's image, and his father's voice, had only just sunk in when, abruptly, it was all over. And all was dark.

He caught his breath, and tried to rein in his overwhelmed emotions. And then he said, "That it?"

"Uh-hunh," Grace replied from the darkness outside his virtual world. He felt the note of sympathy that tinged her voice.

His dad in the machine, recreated in a whirl of light, felt to Davey nearly as real as reality could create. But something was missing.

Nearly ten years were what was missing, Davey realized. Ten years since his father's image had been digitized and containerized in that tiny e-clip. Ten years that had taken him from toddler to young man, without a father.

"Play it again," he said. "Wait... grab your ONE, and get ready to enter something... then play it again." He took a deep breath, and tried to steel himself, to focus. This time, as he gazed upon his dad's image, and listened to his father voice, he repeated the words aloud for Grace to transcribe:

You have all you need to find me. Your mother can mark the way. You know where and why... you need to know when? The e-clips will tell you when. Come as soon as you can, son. As soon as you—

The image dissolved and faded away.

She read and reread the words Davey had dictated to her. “What could it mean?” she asked. “Davey?”

But Davey was a world away.

“You really think we could find him... your dad?”

“Yes, kids. I do,” a voice answered from behind where the two stood huddled over Grace’s ONE, which she had strung from her neck on a lanyard.

Grace and Davey spun around to face the source of the words, only to find a beloved, but impossible, image before their very eyes.

20: EINSTEIN'S ENIGMA: THE BIG ToE

Behind it all is surely an idea so simple, so beautiful, that when we grasp it – in a decade, in a century, in a millennium – we will all say to each other, how could it have been otherwise?

John Archibald Wheeler: (American) Professor of theoretical physics, and Princeton collaborator of Albert Einstein's in his later years. Annals of the New York Academy of Sciences, (480) 1986

Davey's mind could not hope to process what it saw before it. Much less believe it. It had the same strange effect the image of his father had had on him only minutes before. Davey was just beginning to deal with the notion that this image appeared to have more physical substance than a hologram, when the apparition suddenly spoke again.

"A terrible shock, I know. And I do apologize," it said.

Hart wheeled out from the shadows to reveal himself more fully.

Grace, overcome with joy and relief and love, ran to her Uncle Ollie and threw herself at him, tears streaming down her face. His chair pushed back slightly to accept the weight of her pressing into him.

"It's okay, Possum," he said, stroking her back. But she could only offer great wracking sobs in return. "I know... I know," he murmured. "I'm so sorry, little one, to have had to do this to you. You of all people, Gracey."

Her ball cap was knocked back on her head, and tears stained her soft cheeks. She snuffled, sobbed a couple more times and pulled gently away from their hug.

"Shall I begin at the beginning?" Hart offered kindly.

The two simply nodded. He had Grace take a seat on a nearby bench that was a part of the HOLOdome control console. She had the look of one overcome by events. Clearly, Hart's return had so surprised her that she was noticeably wilting. And Davey, still reeling from the shock, felt light and sort of dizzy in a way that left him almost giddy. He couldn't sit down quite yet. He worked to stifle the excess of buzzing energy and concentrate on Hart's words.

"This is about your dad, Davey," Hart said gently by way of

preparation.

What? Davey thought, momentarily stunned. Was he going to talk about all the money his dad had been accused of stealing? Or did Hart all of a sudden just confess to actually knowing his father? His mom was clearly on the right path if that was the case.

While, by now, Davey knew that his dad factored into this mass of confusion somehow, he still hadn't been able to get his head around quite how. Hearing Hart's words sent a tingle throughout his body. For a brief moment, he felt light-headed. Davey wanted to urge Hart to continue but, at the same time, was scared to death of what he might learn. And Hart's look of kind concern only served to heighten his anxiety.

Hart wheeled himself in closer to the pair. "Your father is a trusted friend, Davey." He paused a moment, as though he knew that these words would need some time to sink in.

Davey reached a hand behind himself without looking, and fumbled for the bench to take a seat beside Grace. A *friend?* thought Davey. IS a friend? His confusion was swirling.

"Yes, Davey. Your dad and I have been friends for many years."

"You mean he was your friend? Or are you telling us you know where he is?"

"That's a complicated question, with a complicated answer. Now, of course I know you are eager to have these answers. But first, in order for you to make sense of them, there are some things I need to explain."

Hart smiled. "Davey... the first thing you need to know is that your father was a very good friend. And was a key early player on the Halo development team."

This revelation was nothing short of shocking to Davey, though it struck him that he basically had no sense of who his father may have been. And now, he realized, neither really had his mother. He certainly hadn't imagined that his dad was some kind of a brainiac (his general impression of all HART scientists and engineers). At least, not before his mother had suggested as much on the day she finally broke her silence about him. Hart seemed to anticipate this misconception, or perhaps he was a capable decoder of Davey's expression.

He clarified: "But I can't tell you where your dad is, and hope to have it make any kind of sense at all to you, without first giving you the background you need."

Davey nodded. He'd sit tight and pay attention and hope that he didn't explode before Hart finally got to telling him where his father was.

"The universe is an elegant thing, Davey. And your dad... he had an

elegant mind,” Hart said. “He had this uncanny way about him, your dad. Like he could see the trees, all the trees, in a forest.” One side of Hart’s mouth crumpled and he shrugged, as though his explanation wasn’t quite satisfactory, even to himself.

Davey had finally collected his thoughts enough to ask for clarification. “I don’t understand, Dr. Hart. I mean, is what you’re telling me that all of this... me being here... you being here... somehow involves my dad? Like, you and my dad?” Davey needed him to at least make this much clear.

Davey felt Grace’s hand settle on his arm, and he was grateful for the warmth of human contact. Without it, the high frequency buzz he again felt rising within him might have caused him to step out of his sensory world, so detached did he feel from reality at that moment.

“I can see that I should have spent more time thinking about how to broach this subject with you. So if you can forgive me my clumsiness...” Hart smiled at the two.

Hart confessed to the kids that he had been drawing Davey in all along. He had a mystery—a ten-year-old mystery—to solve, and the only real clue he’d ever had was Davey and his mom.

“You need *us*? Why?”

“I’ll get to that, I promise, but you are going to have to give me a little time to explain. Because, at the end of my explanation, I’m going to have to ask you to believe what I have to tell you is true. With nothing more to offer as proof than science and math and theory that is elegant and beautiful. But terribly hard to wrap one’s head around. At any rate, I promise you...” Hart held his right hand up shakily in oath. “My word. I’ll keep the details to a minimum and not burden you with more than required to get you where you need to go.”

Hart began his treatise, something like a loving testament to the history of science. “Scientists just want to know how the world operates, kids. On the boundaries of science, in the domain of physics, our explorations are into the true nature of reality. It’s here we can sometimes brush up against philosophy... or worldview. And history has taught us that it can take generations for transformative ideas in science to populate. No matter how many bright minds are convinced, for an idea to take hold in the mind of the world can take decades. Centuries, even. Especially these days, where people appear to be much more interested in what the latest reality star is wearing than fundamental questions like these.” Hart shrugged resignedly.

“The Inquisition held Galileo hostage in his own home, you know. Where he spent his last eight years confined for the heresy of defending Copernicus’s science, and not disavowing what he and Kepler also knew to be true: that the Earth revolves around the sun and not the other way around! It took over a century for the world to

eventually come to accept the transformation in thinking that Copernicus began. Even though none of our senses seemed able to give evidence of our spinning orbit, we eventually, stubbornly, had to admit to a truth beyond what we were able to perceive.

“Fast forward to the crazy world of quantum mechanics, poking around in spaces so small, where the rules are largely proven with math and thought experiments because for the longest time we had difficulty reaching in to such tiny places with instruments and experiments to test our ideas. And, boy, was there ever some freaky stuff going on down there in the world of the sub-atomic. But it’s hard to believe what we can’t see or feel, or evidence for ourselves.

“And... physicists? Some are mystically inclined to be sure, or religious in some sense, which helps. But I guess in general they have learned to be okay with poking around at the edges of the truth, trying not to look too closely at what their findings mean. To blur the lines between science and philosophy. Especially because what these findings ask us to conceive of is astounding, and point towards an entirely new interpretation of the universe. Thinking of the universe as fields. Fields within fields. And much much more. But we’ll get to all that soon enough,” he promised.

“Our story really all began nearly four hundred years ago. When Newton gave us his three universal laws of motion and described a world in which everything was subject to gravity. His work was a revolution and led the way for our modern scientific age. But in Newton’s mechanistic classical view of the universe, gravity is not a *field* but merely a model describing the effects that gravity has on objects, on mass, as a force. And yet, even Newton was certain that the invisible substance that permeates the universe, which he called aether, was responsible for gravity. He also attributed our body’s sensations to aether. Newton thought of the aether as a living spirit. But he understood that the equipment to prove its existence had yet to be conceived.

“Since then, we’ve been making pretty good use of a bunch of these fields, as we’ve learned to find them, and measure them, and harness them, spectrum by spectrum. The part of the electromagnetic spectrum we can see, the visible spectrum of light, is one of many waves in a field we’ve learned how to interpret, bit by bit, since the dawn of man. Like electricity. The electromagnetic energy that—through observation and trial and error... and great science—we’ve somehow learned to extract from the field. And yet we’d no idea what electricity *really* was, other than a flow of charged sub-atomic particles we could somehow mine from the field and use to power... well... just about everything in our lives, of course.”

Davey and Grace looked at one another briefly. Hart took a sip of

water from a bottle attached to his chair.

“With Einstein’s field equations we came to know gravity as a field. And came to know the one unifying characteristic about the entire universe—its field properties. Whether electromagnetic, electrostatic or gravitational, they are distinguished only by the instruments of their measurement. Subtler and subtler. The spectrum gets subtler and subtler. Even Einstein felt strongly that space without aether was unthinkable, as space had to provide a medium to transmit light.

“Now, we know that there is a vacuum energy all around us all the time; energy that exists at every possible wavelength. We don’t notice it. Kind of like a fish in water. The fish probably never notices the water around him, but he sees the things in it. Likewise, we never notice the aether around us; we just see planets and stars and people and fish all around us. But we pay no attention to the aether, just like the fish pays no attention to the water.

“Space is, only to a point, a vacuum. But it is never truly empty. Even at ground state, at zero point, there remains an energy.

“Because as long as there is matter, there will be fluctuations as particles come into and out of being. This is one of the weirdnesses of the quantum world; something we’ve known for over a century. Since the 1920s quantum mechanics has been revealing truths that were so mind-bending, even counter-intuitive, that it was simply more comfortable to ignore what they suggested about the true nature of our reality.

“In that weird quantum world of superposition, a particle is everywhere at once, with only a probability of being in one place or the other. Until it is observed, and establishes its position, that is. As these particles pop into and out of existence, they create a Schrödinger wave function, that explains, with probabilities, the chance of a given event or outcome.

“Schrödinger famously explained superposition with a simple thought experiment: He proposed putting a living cat into a steel chamber, along with a cat-killing device that may or may not be activated under a complex set of circumstances that were basically his way of saying ‘with a 50/50 probability’. The result being, until we open the chamber, and fulfill our role as observer, there’s no knowing whether we will find, inside, a dead cat, or a live cat. And so, until we let the cat out of the bag, you might say—until we learn the condition of the cat and the superposition is lost—we have both. A dead cat and a live cat.

“So... for many years the objective was to bring it all together. A universal field would have to marry the quantum rules of the universe of the very small with the understanding Einstein gave us of gravity and the universe of the very large... the cosmos.”

“A Theory of Everything,” Grace pronounced, to which Hart nodded emphatically.

“Or... the big ToE, as I like to call it,” he said, smiling. “Best known as the Unified Field Theory.”

Hart offered the kids a break—and a chance to ask any questions. Davey had a million, but he really just wanted Hart to get on with the story; to get to the part where he learns where to find his father. And was somehow mysteriously okay with listening to that unfold through Hart’s tale.

“We went *everywhere* looking for the universal field,” Hart continued. “Even following string theory into an unimaginable eleven-dimensional space. But here’s the best part of the story. It’s been right under our noses all along! We’ve had the equation since the ’60s. It emanated from the incredibly fruitful mind of a young contemporary of the father of quantum physics, Niels Bohr, and of Einstein’s at Princeton. A great teacher and mentor, and patron of a lineage of some of the world’s most amazing scientific thinkers. The guy that coined the term Black Hole: John Archibald Wheeler.

“Johnny Wheeler and his long-time collaborator, Bryce DeWitt, gave us what should have been the next most famous pocket-sized equation, after Einstein’s $E=mc^2$. They originally humbly published it in 1967 as the *Einstein-Schrödinger* equation. The Wheeler-DeWitt equation, as it has since been known, is a wave function for the universe; or so Johnny called it. Gravity was our missing universal field, Davey.” Hart clumsily drew the Wheeler-DeWitt equation $H\Psi=0$ on a Tablet that he’d retracted from the arm of his chair, using a tiny stylus permanently attached to his palm strap. Davey thought it even more succinct and beautiful than Einstein’s, if that was possible.

“But it’s quite one thing having an equation for the universal field, and quite another thing solving for it, as you’ll soon hear. And quite another, I remind you, to have the world accept any new paradigm that might tag along with understanding those solutions.

“Here’s why the Wheeler-DeWitt equation hung around for so long. Even though it made some physicists crazy it was so laden with difficulties. Because it was right.” Hart smiled broadly.

“But it also spoke of a reality that was weird beyond belief, and took us forever to get our heads around. Among other things, it basically suggested that this wave function of Schrödinger’s never really collapses, but instead all possible alternative histories, and futures for that matter, exist. That our world is constantly splitting into multiple new worlds, where each of the probable outcomes does in fact occur. So, in essence, there would be both a universe in which Schrödinger’s cat is alive, and another in which it is dead.

“One of Wheeler’s great students, Hugh Everett, postulated this;

what Bryce DeWitt later called *many-worlds*. If I told you that this notion was greeted with a good deal of skepticism, to say the least, I don't suspect it would come as much of a surprise to you both?" The kids agreed. This was weird stuff, indeed.

"And the Wheeler-DeWitt equation suggested another great paradigm shift: doing away with time. Or, more... to come to think of time differently. Barbour and Bertotti would persuade us the only reasonable way to merge Einstein's relative time with quantum mechanics' more classical treatment of time was to take time out of the equation, as Wheeler-DeWitt also suggested. To use time more as tool for explaining the change of things, and not as an expression of duration. But, I'm sorry... I digress. I promised you parsimony. So far so good, though?" Hart asked. The kids nodded.

"Then, in 2011, some fifty years after Wheeler-DeWitt is conceived... your mom would have been about the same age as you are now, Davey... out of left field, quite literally... out of a totally separate branch of physics called condensed matter physics, these two sharp young Ivy League guys called Wen and Levin are looking into a new state of matter. Inspired by Laughlin's Nobel Prize winning work on fractional charge, these boys unknowingly put the paradigm shift into high gear.

"Wen and Levin are onto this idea that there may be a different way of thinking about matter. They conceive of a world where wiggling strings of photons give rise to electrons at the end of the string. And they imagined a huge net of these strings. They call it a *string net liquid*, but don't be confused by the name. We have a tendency to think of states of matter as self-evident... if you can pour it it's a liquid, that kind of thing. But material is defined in the quantum by deeper characteristics of its nature: the symmetry and spin of its electrons. So when I say liquid, I don't necessarily mean liquid in the common sense.

"Anyhow. So they do the math, they model it. And their string nets give rise to both particles and Laughlin's quasi-particles. Oh, nice! Check that!" Hart's hand moved awkwardly though the air in his tetraplegic manner, yet unmistakably mimicked ticking an air box with a stylus. "Then, by accident, they find that the net of strings vibrate just like Maxwell's equations said light would. Okay... unexpected, but also nice. Check again. Then, to top it off, a whole big bunch of elementary particles arise from their model. Including something still too subtle to detect any other way than mathematically: the graviton. But all fundamental forces have one or more messenger particles, so we have simply gone along believing it must also be true of gravity. Hold on to that thought of the graviton, and I'll tell you why that matters to us in particular in a minute. But

that gets another check,” Hart added, smiling.

“So... this model of the string net liquid has basically unified light and matter. And conceived of a universe where elementary particles emerge from the structure and the string net geometry of space. Where matter becomes like gravitationally trapped light!

“Now, this is pretty exciting, you understand. Very unexpected but very exciting. I mean, this new string net liquid state of matter is behaving very much like the universal field we’ve all been looking for! Einstein himself taught us, with his famous $E=mc^2$ equation, that matter and light are both energy. And here we’ve got matter *emerging* from a string net of photons... matter coming out of light!

“So, this really got their gears turning, I can tell you. Wen and Levin are immediately thinking about how to take this to next level. Can they find an example of this new state of matter? See, ordinarily, electrons prefer their spins to be in the opposite direction to their neighbor’s. But in a triangle this is impossible. So a team at MIT starts scouring the geology journals. And they come across Herbertsmithite, an emerald crystal found by accident in an opal mine in Chile, something like forty years earlier, in the 1970s.

“Turns out Herbertsmithite is the only example of its kind of this new state of matter that we’ve been able to find. Its electrons are arranged around triangles in a two-dimensional Kagome lattice; like a star tetrahedron. Or, basically the shape of the Jewish Star of David: two interpenetrating triangles. Now, note that I said two-dimensional lattice. Keep the two-dimensional geometry in mind for a minute, here, and we’ll get back to that in a sec, too.”

“Graviton and two dimensions?” Grace repeated, reminding herself to take note of these.

“That’s right, Possum. Now, around the same time, things are coming to a head for the Stanford physicist that had brought us string theory in the first place, Lenny Susskind. Since the ’90s—so around the time your dad was born, Davey—he’d been building on the work of guys like Thorn and ’t Hooft, who each had each proposed the same conclusion from their physics. But Susskind gave it the string theorist’s seal of approval. And that matters because for a long time the only research that seemed to be getting any funding and attention in physics was string theory.

“Anyway, one minute Lenny’s tackling a problem that was basically a bet between him and Stephen Hawking about black hole entropy, and before he knows it he and his colleague Raphael Bousso are talking Holographic Principle. As in hologram. Which is about encoding three dimensional information on a 2D space, like a 3D image on a photographic plate.”

Hart began to chuckle, saying, “Here we’d been strung along by

string and all its extra dimensions, and then abruptly we've taken a u-turn into two dimensions. The basic idea being that all the information to create our universe can be stored in tiny scrambled bits of data, 0s and 1s, on the outer surface of our universe. And that, outside our universe are others just like ours. Just like Everett's many-worlds.

"Soon everyone is talking about the holographic universe. Susskind and Wen are by now both affiliated in some manner with the Perimeter Institute up in Waterloo, Ontario, in Canada's Quantum Valley. Wen fittingly inaugurates Perimeter's Isaac Newton Chair in Theoretical Physics. And Lenny swings his work around to Wheeler-DeWitt in 2D. Johnny Wheeler had always thought of space as geometry. As topological. He so would have loved this."

"Uncle Ollie, this all just seems so incredible... you know?"

"Possum. I do know. Since pretty much the beginning of the 20th century—Einstein's miracle decade—we've known that matter... particles... were just energy. Since the 1920s we've known that nothing was as solid as it seemed. That at the smallest level, particles blink into and out of existence. That nothing is really here. It's all just energy waiting to be observed.

"Now I add to this strange paradigm with the notion that our reality is like a 3D projection of the data encoded on the surface of the universe, in much the same way the HOLOdome creates a virtual reality by projecting a 3D HOLO into the dome with you.

"Wow, Uncle Ollie! I'm not sure what to make of this..."

"Indeed. Neither is most of humankind, honey. Einstein himself had great difficulty accepting the weirdness of the quantum world of probabilities. Late in his life, he wrote of his exasperation to a colleague, Max Born, saying he was convinced that someone would eventually come up with a theory whose objects were not probabilities but facts. But lamented that he could only produce his little finger as witness." Hart smiled, and waved his little finger.

"So what, if I tell you the universe is a quantum topological computer? It from bit, Johnny Wheeler called it. And that the reality you experience is only one of many possible realities? Does it change how you live, right here and right now? How you interact with reality? It seems not.

"We are so entranced by what our minds tell us we are experiencing as reality, so convinced in the truth of the little finger we see before us, and so vulnerable to self talk from a powerful and defensive ego that needs to believe *it* matters... that we continue on as before.

"Maybe... if we feel the nudge of the truths science is uncovering... we begin to understand the interconnectedness of all things. The idea that at the deepest level there is no me, just we. And maybe we

become a little kinder to one another?

“Maybe... if we can believe the power of our role as observer, we become a little more mindful of our thoughts and of our feelings. And more attentive to the kind universe we bring into being.”

“Or maybe, like the rest of humankind, we fit what we can into our worldview. We are more comfortable if we can follow what that little finger can point us to. If we can look for something we can measure to make just a little more sense of it all. And for us, that was to go looking for the graviton.

“Okay. So... so, Einstein predicted the existence of gravitational waves back in 1916 as part of the theory of general relativity. We can think of gravitational waves as coherent states of lots of gravitons. Around the time of Wen’s string net liquid discovery, we had two giant Earth-based systems, LIGO and GEO600, set up to detect gravitational waves.

“They hadn’t yet detected a gravitational wave when Craig Hogan came calling. Hogan—the astrophysicist who discovered cosmic Dark Energy by the way—had a theory about space at the smallest scales. We’re talking small, like a hundred billion billion times smaller than the nucleus of an atom. His theory was that, just as when we look closer and closer at a digital picture the image gets pixilated, when we look at the universe at this small scale it also gets... well... lumpy. What Wheeler called *Quantum Foam*. And Hogan believed that this lumpiness would produce something called *Holographic Noise* that should be detectable by a gravitational wave detector. Turns out the German-British GEO600 had been struggling with a low-lying noise, or static, in their experimental data, confirming the existence of Hogan’s theorized holographic noise. Which, if you grok to Hogan’s thinking, is further evidence of a holographic universe.”

“Whoa!” Davey was blown away.

“Soo... if I hear you right... rule of thumb when it comes to the big ToE...” Grace gave them both a cheeky grin. “Even if you follow the little finger, you wind up with a whole handful of weird.”

21: LETTING SCHRÖDINGER'S CAT OUT OF THE BAG

The quantum theory of parallel universes is not the problem, it is the solution. It is not some troublesome, optional interpretation emerging from arcane theoretical considerations. It is the explanation, the only one that is tenable, of a remarkable and counter-intuitive reality.

David Deutsch: (Israeli-British) Oxford physicists and one of the most influential thinkers of the modern era, who is reshaping our understanding of the nature of reality.

The Fabric of Reality, 1997

“Here at HART Corporation, we were looking for the graviton, but for entirely different reasons. We saw where the science was pointing and moved quickly. And while everyone else has spent the last twenty years grappling with the truth, we took it as fact, and expanded. Pushed the science to the bounds of our imagination.

“This is back in 2011. We were really just getting traction on the Halo project with our international consortium. There was another big gravitational wave detector called LISA that was being built by a bunch of the space agencies. Instead of detecting gravitons from here on Earth it involved three satellites in outer space. When NASA backed out of funding the LISA project we worked a side deal. We took over elements of the project and a bunch of their scientists and ran it privately out of the back shop of the Hart's Halo project.

“For a long time scientists had conjectured that the opening of a wormhole happened with the collision of two black holes, only with one black hole in this universe and one in another. The collision would connect them, like two of Everett's many-worlds.

“The collision of two black holes sends ripples on the gravitational waves, and we have the world's most sophisticated and sensitive gravitational wave detector out here in space with us. The collision of two black holes, one in each of the parallel universes, shakes gravity and out comes gravitons.

“When wormholes connect two parallel worlds, worlds closest to us are most like ours. A many-world close to our universe might have split from ours, and be unique to ours, in only one key element. One key choice... like maybe in their universe the Cleveland Browns

actually win the Superbowl.” They all smiled.

“So, one of the other likely probabilities in the Schrödinger wave of a key event will have happened in that universe and not in our universe. Each of these many-worlds has a signature based on how far away they are from our universe—effectively the sound of their collision. We believed we could use this signature to find a universe very close and only ever so slightly different to our own. And find it again and again by its unique gravitational wave signature.

“We’d also known for a long time—mathematically, that is—that wormholes could conceivably allow transportation of information or materials across vast distances of space, and through and into these other universes.”

“Travel? To other universes?”

“Yes, we can travel into one of these many-worlds or parallel universes, Davey. Now back, at long last, to what this means to you and your dad, Davey. You have been very patient.

“Here it is Davey: Together... your dad and I figured out how to traverse a wormhole!

“I know... right now you’re probably wondering why nobody is talking about this? How such a great discovery could be so unknown? Am I right?” Hart continued without awaiting a reply. “Private sector science. That discovery was made by HART Corporation. And it didn’t quite suit us, just yet, to have it widely publicized.”

Davey couldn’t help but be impressed. The whole thing bordered on being over his head conceptually. But still, he was impressed. “But I thought that wormholes were not a tunnel; that nothing could actually pass through them, or something?” Davey ventured.

“This is often true. First off, they usually exist only at the smallest scale, in Wheeler’s Quantum Foam. And only for a fraction of a second, before gravity snaps them shut. And for a long time, our research suggested that there was simply no passing through.

“Now—this is key—it turns out that, in the earliest moments of the universe, gravity itself may have given rise to regions of negative energy in which natural, self-stabilizing wormholes formed. Such wormholes, created in the Big Bang, are still around today, spanning an infinite number of distances in space and time. And negative energy is created from the attractive force of *large* gravitational fields, such as those created by planets and stars. This gravitational negative energy can be used, if well understood, to work with wormholes. To hold the tunnel open. To allow us to travel through space, through time, and through our universe and into others.”

Davey was dumbfounded. He looked at Grace, who was bubbling with excitement.

“And... your father?” Hart resumed. “He came to understand the

negative energy shift required to help open the wormhole—to stabilize it momentarily. And hold it open.”

“So you can get *through* these wormholes, Uncle Ollie?” Grace asked, by now fully engaged in the conversation.

“Yes, Possum. When these large gravitational fields are just right, you can count on them to hold the wormhole open.”

Hart inched closer.

“And now I’ll cut to the chase, if you will...”

Davey was so overwhelmed, he could hardly imagine what that might be.

“As a part of your father’s gravity research, he learned that it was theoretically possible for a time differential to exist between the two black holes. This type of wormhole, located on the bridge of two bubble universes that were ‘stretched’ in time you might say, would provide a pathway backward and forward in an alternate universe’s time.”

“If I’m getting this... the implications of this... well, good God, Uncle Ollie!”

“Quite,” Hart answered proudly. “And it turns out that time-separated wormholes are an extremely common occurrence of nature. But, measuring that time separation? And knowing when the gravitational conditions would be right, in both universes, to make the wormhole that connected them stable and passable? That was a big part of the trick. And a big part of your dad’s work, Davey.”

It seemed, in the flurry of explanation that followed, which Davey was only partially able to decipher, his father and Hart had jointly developed a “Device” that contained all the code and calculations necessary to establish the many-worlds destination on these trips through wormholes.

And that it did so based on the alignment of the inner, terrestrial planets—the only ones made of rock, or solid mass, and therefore capable of affecting the physical, gravitational, properties of our solar system. The outer planets, made of ice, gas, and liquid, are of less consequence to the gravity we experience.

“But your dad’s project was compromised. One of the Devices was stolen from our project headquarters. We knew it had been taken by someone on the inside. Someone on our Hart’s Halo core team, in fact, provided the only explanation. It’s still hard for me to imagine. At any rate, though we had some confidence that whoever took the Device wouldn’t easily be able to establish how to use it, we became very secretive and protective of the program elements. Quite naturally, we conducted the rest of his work under a veil of enormous secrecy.” Hart looked at them intently, as though to convey the seriousness of the threat.

“Under my orders, your father was to share the details of his work with no one. Not even with me. Together, we devised a plan that would protect his work, keeping it entirely secret to him. A plan that wouldn’t even give me access to this information until it was time, according to our plan.” Hart paused for effect.

“That time is now, Davey.”

“Time for what?”

“Why... time to go and find your father, son.”

His father had crossed over into an alternate universe, Hart told Davey. One only millimetres away from ours and, as such, very much like ours.

“My work taught us that each wormhole is a static portal, that connects, back and forth, to one alternate universe. Using gravitational wave signatures, I located a reasonably close, short portal. And your dad was able to determine when it would be stable enough to traverse, and the time separation we could expect in the alternate universe it connected to at those times.

“Nearly ten years ago, when the Halo was just barely able to support his doing so, Davey, your dad went into that wormhole. Into that parallel world.”

If Hart was waiting to get a sense of the effect of his words, Davey knew he would have to wait a long time. Davey was numb. He had no idea what to make of the string of words Hart had just uttered. He could not sort them into logical sense, or draw anything like a conclusion from them, much less an emotional response. His dad. In a wormhole. In a parallel world.

Grace, however, was obviously astounded. She squeezed Davey’s hand. Her face showed an empathy Davey had every reason to expect in her, yet which surprised him anyway.

“The hardest part for me in all of this, Davey—and I know I can’t hope to measure the sorrow you have had to bear over this same matter—is the sacrifice your father made. It was an unspeakable personal sacrifice, on his own behalf. As well as on yours, and your mother’s.”

Davey wasn’t entirely sure where this conversation was going, but already his emotions had jumped to that place. His eyes streamed tears he didn’t even bother to wipe away, knowing that they were only the first of so many he would shed over this story of Hart’s... of his dad’s.

“Much like the circumstances that led to my, well, *faking*, for lack of a better word, my own death, I had to somehow explain *why* your dad had gone... disappeared. Without being able to explain *where*, you see?”

The reasons were complicated, Hart warned them. But Hart

explained that, for a lot of reasons, the measure both he and Davey's dad had agreed upon was that HART Corporation would announce suspected corporate espionage and place David Randolph at the center of the scandal. They had fingered Randolph for a conspiracy that had cost the corporation an estimated \$300 million, from which Davey's dad would have received a very handsome paycheck. As a private corporation they were able to play this down and on the quiet, while leaving an indelible record of the facts they did allow revealed. There was a thorough but terse investigation of the trail, quickly gone cold, of a smart man who didn't want to be found and who had left with his pockets full.

An embarrassed private corporation could be understandably careful and reticent following such an incident. They could allow only enough information to be known as suited their telling of the story. This story would serve the dual purpose of revealing David Randolph's disappearance, while also explaining, if necessary some time down the road, the fact that a Device had found its way into strange hands.

And, with that, Davey realized he had the beginnings of some understanding of why his mother had struggled so much.

"Why had I never learned of this before? You'd know I would one day google myself. Or my dad, which is effectively the same thing. Did you...? Could you...?"

"I am a very powerful man, Davey. It's true. There was just a quiet little investigation and we all moved on. And you've never seen a journalist—and there were only two who stumbled upon the public records of our investigation—you've never seen a journalist more delighted than to get paid to not have to write the story!"

"Why didn't my mom get to know about all of this? Why couldn't she just be told what my dad had agreed to?" Davey felt sick just asking, knowing what the answer would likely be.

"Your father troubled many long hours over that one, Davey, I can assure you. In the end, he agreed it was best not to disclose the truth of his departure to your mother himself. Our plan—our agreement—had involved that rather elaborate tale necessary to explain his disappearance to the public, and then, later, a letter from your father would be given to your mom."

Letter? Why hadn't his mom mentioned anything about that letter? What had it said? He'd get to that soon enough with his mother, but first he needed to know: "You haven't really explained... what did he go into the alternate universe for? What could have been important enough for him to... to abandon his family like that?" There: That was what he really wanted to know. And his somber tone did not disguise the importance of the answer. Or of his need to find some kind of satisfaction from the answer.

“Ah... the *penultimate* question. Why penultimate? You’ll understand in a moment. He did it, Davey, for *me*. He changed the course of my history—at least, in that one manifestation of my life. He went to make a whole man out of me, Davey.”

“So, are you telling me that my dad went into this alternate universe... what? To some time before your accident happened? Is that what you meant by *making a whole man out of you*?”

“That’s right, son.”

Davey hadn’t time to think about why he was so angry with Hart, knowing that there were probably hundreds of reasons he should be. Instinctively, he felt the rawness of Hart’s words, and wanted to yell, with teeth clenched in anger: *Don’t call me son*.

“And he’s been stuck there for ten years?” he said incredulously, instead. How could Hart have done this to his dad? How could he have done this to him?!

Hart explained that he had wanted to go back to just before his adolescent accident in an alternate universe. One very close to ours. “But I couldn’t just go by myself, of course,” he finished grievously, with a sweeping shrug that offered his wheelchair as explanation. “In my condition, that I don’t have the hands and feet necessary to pilot is only part of the reason. When I explain the nature of the journey, you’ll see why it had to be your father. And one of us needed to be here to continue work on the project in this universe. To ensure the other could get home.”

“But, I don’t understand... why didn’t he just come straight home after changing your history?”

“Davey, he went into a time—back to 1993—in this alternate universe when this kind of space travel didn’t exist. There was no vehicle there to bring him home. And the vehicle he’d used to travel from here, just by virtue of its design... it was a one-way trip, Davey. For a lot of reasons, traveling to 1993 could only be a one-way trip.” Hart let this sink in.

“But...”

“A one-way trip,” he reiterated. “Until today. Now, with the space station construction completed on this side, and with every expectation that the space station construction will have mirrored our progress over on the other side, we are equipped to make that return trip. The Pod, Davey... the space vehicle? It can travel between one Halo and the other. Between one universe and the other.”

Hart told them that the secure area in the g0o zone was, in fact, the port for what they had termed “the Pod.” Small enough to fit into a barely expanded wormhole. So small, in fact, it had to launch from the Halo—from *outer* space—as opposed to from within Earth’s gravitational environment.

“The smallness of the vehicle was only one factor. One which we might have been able to overcome. But, more on point: If we wanted to keep our work secret, at least until we’d fully developed the technology, we had to be able to do our... research... without intrusion. Which meant that we could not launch the Pod from anywhere within the Earth’s atmosphere without risk of detection. But from out here—from the Halo—from outer space, where the electromagnetic pulse that is a part of its zero point field propulsion system would not be quite so readily perceived? Or from where it could perhaps be more convincingly explained, or glossed over, on the off-chance it was indeed detected? That, we could do!” Hart said enthusiastically.

“The only thing is, we’d have to behave equally discreetly in the alternate universe if we wanted our activities to remain as unremarkable, as undetectable, in that world as in ours.”

“The Pod is capable of a return trip to the alternate universe, but only to and from outer space, at the *space station level*, and not from Earth?” Davey asked.

Hart affirmed this, then further explained that the tiny Pod could only complete the trip to the alternate universe at certain times, because the opening of the wormhole was so greatly affected by planetary alignment. The planets and where they are in their orbits on any given day determines how much they will affect our gravity. Shrinking and stretching, contracting and expanding, the wormhole is like a short tunnel with a girdle on it. And the alignment of these planets—and their effect on the gravitational systems in that part of our universe, gravitationally squeezing the vacuum energy—make the tunnel shrink and grow and the girdle tighten and loosen. Generally, the wormhole is impassable. “But occasionally, when all the planets are appropriately aligned, so to speak...” Hart smiled at this. Spiritual jargon come to life. “When the universe’s gravitational alignment is such that the black holes on either end of the wormhole offer just the right separation between universes, the wormhole becomes not only passable, but traverses into a specific alternate universe—into a specific version of that universe, forward or backward in what we perceive as time. The way this planetary alignment affects each system’s gravity and both universes’ wormholes? As I mentioned, that happens in a way that only your father understands completely.

“So your dad was committed to being there until the technology could develop in that alternate universe to bring him home. But this achievement would rely on the work of thousands of people, as it would require him to leave from a space station like this. Only, one built in that parallel universe. Of course, he went with every kind of electronic plan for the construction of the space station, and of the

Pod.”

“So, he goes there in 1993. And he has to change as little as possible. For 30 years,” Davey says, processing. “Until the space station is built in 2023 and he can come home? We had enough of the Halo here by 2023. Had people living on it already, to build it out. Presumably they would too, with my dad working from that end? Why didn’t he come home sooner? Why isn’t he home yet?”

Hart’s mouth opened but no words came out.

“If he had a Device to go over there, he... my dad... he was capable of these calculations, right? Finding the right wormhole and establishing when it was open enough to travel through, or whatever?”

“Well, in truth, because of the loss of that one Device, and the threat of corporate espionage, it *had* to remain that *only* I knew how to use the Device to locate the right portal by its gravitational wave signature. Something *only* I was able to program into the Device before he set off. And something *only* I can program into the Device for his return trip. A two-part process, split into two discrete parts, held in two separate minds. For security reasons, you see... for the very protection of the program itself.”

Davey felt ill. His father couldn’t come home on his own because he only knew half of how. Hart knew the other half and wasn’t sharing. His father had been held hostage to Hart’s protectionism. Hostage to Hart’s distrust. Hostage to Hart’s hoarding of his intellectual property. Hart: keeper of the key. Sole purveyor of the information that would allow his father to come home. He could only shake his head. No... *no, no, no!*

“This was done out of necessity, Davey,” Hart explained, perhaps sensing Davey’s distaste. But Davey wasn’t listening any more. He pushed up off the bench and began pacing in front of it; back and forth in short hard bursts.

“It was for the sake of the preservation of the project,” Hart stressed. “It *had* to be partitioned this way.”

Davey was done listening. He was beyond being reasoned with. “You stranded my father over there, waiting for you, for the *preservation of the project?*”

Hart’s tone tried for gentle and compassionate. “Believe me, your dad and I went over this every which way. But let’s put it this way: If there had been a way to bring him back sooner, we would have found it. Absent that, we have our plan in place. This is the best alternative. The easiest, cleanest, safest way. To go with a direct routing that we knew we could anticipate late in 2033. That much he was able to share with me, without compromising *his* privileged information.”

“You said we have to go find him?”

“Yes Davey. We have to go. He is prepared for this, Davey. He’s

waiting for us... ready to come home, we hope.

"You *hope*?"

"Yes, well, I suppose it's a bit like Schrödinger's Cat, isn't it?"

"I'm not following," Davey said, somewhat impatiently.

"Well... just that, much like Schrödinger's equation would suggest, we won't know for sure until we get there to see for ourselves which of the universe of probable futures we'll find your dad residing in."

"You're likening my father to a... to a *cat*? To a *dead cat*?"

"Well, no son, of course not. Simply trying to state the obvious. That we won't really know what we'll find until we get there. So, for the moment, as far as we can possibly know, your father is very much alive. And we must proceed with that assumption as our central tenet, no?"

"When will the portal be open?"

"When? Well, that's just it, Davey. We've arrived at the main point. We decided together not to keep records of when the wormhole opens. And what's more, for additional security there were also no records kept of the Pod's launch codes, which your father programmed before his departure."

Hart explained the plan he and Davey's dad had devised. After his staged defection and disappearance, and some months in final preparation spent secluded at Hartland, he would come up to the Halo. This was ten years ago, when the Halo was in a phase of construction where it was just able to support him. He would then, with the help of a trusted colleague, launch a Pod from here, traveling through a wormhole and into 1993 in the alternate universe, where he would fall to Earth, abandoning the Pod. There, he would change the course of Hart's future by saving him from the accident that would otherwise make him a tetraplegic at the age of eighteen.

"Before leaving, he would re-program the launch codes on the Pod bay here, and leave me, and you, puzzle clues to uncover the launch window—when the wormhole would be open—as well as the Pod's launch code."

"Puzzles?" Davey felt a jolt of nervous excitement.

"Yes, son. All of them. From the box you received at Hartland—which contained, by the way, the only existing copy of the Pod bay key—to the entry code to g0o. Your dad had a hand in all of them. He had prepared them ten years ago, leaving me with the plan to implement. Of course, I had already opened the key box... But I must admit, I have been very impressed by your resourcefulness. And will be counting on you to sustain that level of originality and imagination as we work through to the end."

Davey was not in the least surprised to learn that his hero—his idol—had opened the key box puzzle himself. That puzzle that had been

meant for him, in search of his own answers.

And to think that a failure, his failure, to have correctly cracked any of these puzzles might mean his father's abandonment! Davey was both horrified and proud of the unnatural confidence his father had placed in him. And proud of his accomplishment. But he was petrified to consider what failure on any level might have meant, and might still mean.

"We knew that, provided your dad let things evolve naturally, the alternate universe would have a space station on line by now. The plan was for me to include you in the Halo, and include you in solving his puzzles. We had discussed timing in the most general sense. I knew that we had to at least be ready to go by now, which, in large part, forced the Halo's production schedule."

"Wait. How did you know I'd be able to help on the puzzles? How could you have that kind of confidence?"

"Well, you are your father's son, after all. And I had made another promise to your dad: that I would keep a non-interfering eye on you, but would ensure that you had the proper opportunities for development."

"Santa?" Davey said. "I thought my mother was always just pretending it wasn't her, but she just told me, before I left, that it hadn't been her. Remember I told you, Grace? Someone left me puzzle books from Santa?"

"Davey, I wish there had been more I could have done. Financially and otherwise. But I was committed. I had made an explicit promise to your father. You were to grow up without my interference. He was very adamant about this. He wanted you to grow up to be, as much as could be possible, the man you were meant to be. He didn't want me to in any way influence that."

But Davey didn't want to hear about the past. His only interest was the future. A future with his dad. "So, now what? How do we get him?"

"I've lived my life here, Davey. Done all a man could want to, and then some. I want to see myself as I might have been... as a 'whole' man. This was the plan all along."

Oliver Hart told the kids that his trip was to be one way. That, at fifty-eight years of age, his intention was to live out his life with the proxy pleasure of seeing his self—his vicarious, alternate self—as a vibrant, robust and healthy man. He was going to stay in the alternate universe.

Davey had another dawning realization, as though the missing dominoes were now in place and the chain had begun to topple. If Oliver Hart had faked his death so he didn't have to explain his

disappearance from the Halo, Grace's dad—as the man who had declared him “dead,” and probably the one who had helped conceal him on the RLV—had to be in on Hart's plan.

“Is that why Grace's parents were so weird about meeting me?” Davey asked, remembering how Grace's mom had slipped up and called him *David*. “Did they... do they... know who I am? What I'm here for?”

“They were good friends of your father's,” Hart admitted, and Grace fidgeted nervously in her seat. “But no. They were not briefed on your role here.

“I had planned to have Commander Gurov take me through the wormhole, and retrieve your dad,” Hart explained. “Only thing is, I no longer have the confidence faith inspires. I simply don't know where to place my faith. After the Device was lost, it became hard enough to know who to trust. But now, after the attempt to steal or sabotage the Pod... Mr. Andersson's death...” Hart read their reactions. “Yes, of course we have to consider all the possible implications of that. In particular, given that we have also learned that the RLV landing, your Omega Shuttle's RLV landing,” he said, jutting his chin toward Davey, “had indeed been sabotaged.”

Hart's revelation of the very real danger Davey and all the Omega passengers had faced hit Davey like a shot to the solar plexus. And confirmed a long-standing fear. Something about the Omega shuttle's flight crew's response to their situation that haunted Davey still. How Kissmann hadn't seemed to be moving like he was responding to the crisis. Then Davey's mind flashed back to his and Grace's G-spin incident. And, for a sickly moment, he somehow knew that Hart was right—all that had gone wrong on this mission was no accident.

But without knowing the source of this sabotage, Hart continued, the reasons for it remained unclear. Futuristic corporate espionage? Other-worldly competition? They had nothing more than conjecture.

“What I think? Whoever stole that first Device was a passenger on Alpha Shuttle. And was such an intimate to the process—to the Halo—that he or she had every assurance of making the cut to ride on the first launch of Alpha Shuttle. Which leaves me hanging rather precariously at this point.”

“So how will you pilot the Pod if you don't know who to trust, Uncle Ollie? You can't do it on your own. You've said so yourself. Or you would have gone in the first place. You never would have needed Davey's dad.”

“It's not just a matter of me getting over there, Gracey, but more than that, we have to get Davey's dad and bring him home. In many ways, I know my selfishness has stolen from you,” he said to Davey, “and from your family. But make no mistake, Davey, your dad agreed

to go. He wanted to go. Certainly, as a man of science, in large part to prove that we *could* go. But still, to assuage my guilt, if for no other reason, I need to fulfill my promise to him. I need to bring him home.”

Davey’s bitterness felt like bile in his throat. None of this had anything to do with Hart’s guilt. And it wasn’t about a debt owed to his dad, he felt sure, either. Hart wanted to complete his plan. More than anything, and with no consideration for the needs of all others, he wanted to get into that alternate world. To see a world where, because of his father’s intercession, Hart was, in his own skewed view of the world, a whole man. Fully realized. Davey was convinced Hart probably wouldn’t much care if it did turn out to be a one-way trip for everyone else involved, as long as there was someone recruited to take him over and thereby fulfill his long-awaited ambition. Whether his interests could be trusted to extend from there, to seeing the others get home to this universe? Not likely.

But all that really mattered to Davey was this one simple fact: He stood the chance to get his father back. Everything else—the duplicity, the scheming—was pale as dust in the light of that one fact.

“He lost almost ten years with you, aging alone in that alternate universe. But remember, Davey, your dad was around thirty years old when he went to my past. He went into that alternate universe through the wormhole, but at a moment where the planetary alignment meant our two universes were time-separated. He stepped into 1993. That would make him just over seventy years of age in present time. We have to acknowledge that this entire scenario is fraught with potential complications. We don’t even know for sure that he made it into the time we think he went to. There’s even a chance we’ll get over there and there will be no space station—that their future somehow differed from ours. Or that your dad won’t have survived and won’t be waiting for you.”

“For ME?”

“Why, of course, son. I thought you understood that when you asked earlier how we might get him? Who else? You’re the only man fit for the job.”

The words registered with enormous shock.

“And now, Davey, to answer that *ultimate* question,” Hart said. “How do we get him back?”

22: SHALL WE GIVE IT TO GES?

When I am working on a problem I never think about beauty. I only think about how to solve the problem. But when I have finished, if the solution is not beautiful, I know it is wrong.

R. Buckminster (Bucky) Fuller: (American) Inventor, futurist and visionary.

“I know from your father’s and my plans that we are in, roughly, the right time frame. But we need the exact coordinates, and the exact timing, to make it through the wormhole opening your father has in mind for us. I had hoped that it would be revealed to you in the e-clip message, Davey.”

“You knew about that, too? That he left those e-clips for me?”

“No. I mean, I knew there was more to the message, and to the puzzles, than met the eye. I had a hand in seeing that the puzzles were implemented; that you met each of them, as it were. And, of course, had solved them all myself at some point.”

Of course you had, thought Davey. “But... what do we do? I don’t know what to do with the puzzle answers. They don’t mean anything to me,” Davey said, trying to keep his panic at bay.

“We listen to your father, Davey. He’s trying to show you the way. Or so I heard from that message to you he put on your e-clips.” Hart told Davey how puzzles had been one of their shared pastimes. That he and Davey’s dad would often use puzzles as a way of challenging one another. And he had every confidence that, taken together, these would provide all the answers they needed.

“Let’s read that message of your dad’s again—the one from the HOLO. It’s the only piece of this mystery that I had been, up until today, unacquainted with.”

Grace thumbed through her ONE looking for the message, and read it aloud to the other two:

You have all you need to find me. Your mother can mark the way. You know where and why... you need to know when? The e-clips will tell you when.

“And then he told Davey to come as soon as he can,” she finished, a look of empathy shared with Davey.

“Oh, my... oh, yes! That’s brilliant, David,” Hart whispered.

“What is?”

“Oh, not you, Davey. Your dad. Leaving that message on the e-clips.

I had all the other pieces of the puzzle. Except for the e-clips, of course, because he'd left them for you with your mother. But they are the missing link."

"Really? How?"

"Their purpose is to tell us how to put the other pieces together."

"But... I don't understand," Davey said desperately, plaintively. "I don't know what he's trying to tell me."

"Don't be afraid, Davey. Your dad wouldn't have left these puzzles for you—have entrusted his safe return to you—if he hadn't fully expected your ability to achieve."

"But I was a little kid when he last saw me. How could he know to expect that I would be able to help him?" Davey said, in anguish.

"Because he saw your potential, Davey. You are his son." Hart put a hand on his shoulder. "And because he had faith."

"I just don't know if I'm *good* enough. I don't know how to do this."

"Let's just do our best, shall we, Davey? And see where that takes us."

"Okay... But where do we begin?"

"Well, what did your father's message refer to? He was trying to tell you something, Davey. That e-clip message is the missing link. It's the only part of this series of puzzles that offers any hope. Think, Davey," he implored.

"Well... It said I already had what I needed to find him. Umm, it seemed to focus on, I dunno, on, like, variables, or something? Like, that I already knew *where*, *and why* ..." He looked to Grace for confirmation.

Grace nodded. "That's right. You know *where* and *why*, but need to find out *when*. Does that make any sense to you, Uncle Ollie?"

But in a blinding flash of knowing—in a moment made of instinct and inspiration—it made perfect sense to Davey. "Ws... The five Ws. I... I had a dream..." he mumbled, trying to explain, and feeling awkward that he couldn't seem to do so. And tying it all to a dream? Made it seem so vague. So silly. But he didn't care. Because the dream was clearly making itself real, that much he did know. And it was anything but vague. That, and he trusted the certain tingly way it made him feel, which encouraged him.

"Where and when?" Grace prompted.

"Yes. That's right," he said, relieved. "The five Ws are the variables."

"Yes, the five Ws are the variables. Quite true," Hart quickly affirmed, delighted. "And so, I think we should give it to GES."

"Give it a guess?" Davey asked, confused.

"No, give it to GES. As in... G.E.S." He pronounced each letter singularly. "It's an acronym. Stands for 'Gestalt Estimating System.' It

is an artificial intelligence system—one of our pet projects. Over the years, we’ve had literally hundreds of Hart’s best people contribute to its development. Fill its brain, as it were. Including your father.”

“Artificial intelligence? Cool!” Grace said.

“Oh, more than artificial intelligence. This system has machine learning. It’s able to adapt and grow, the more you use it. It’s amazing stuff. Your dad was a keen developer, Davey. He oversaw the massive programming project that established all the ground rules for GES.” Davey felt a surge of pride in his father; a feeling so welcome, yet simultaneously so foreign, it was hard to hold on to. Thankfully, it seemed to find a comfortable place deep inside him, and settled there.

“You are probably more than adequately acquainted with WIKIs,” Hart continued. “Seeing how they’ve become such a staple in the way we’ve come to share and compare and crowd source information over the last few decades. What you may not know is that WIKI is Hawaiian for *quick* or *super-fast*. And, if you know the history of WIKIs, you’ll know the Portland Pattern Repository was the earliest of these data-sharing and processing tools, developed some nearly forty years ago. The concept: infinite contributors—common knowledge that’s uncommon—enmeshed in such a way as to generate patterns.”

“And super-fast,” Grace added.

“That’s right. And GES is the next generation. It takes seemingly random patterns and looks for the gestalt. You see, *gestalt* means *whole*. The GES takes seemingly disparate things and looks for patterns within. You know... on the theory that the whole is greater than the sum of its parts? That together, these component parts have synergies, or a holism, that is only reflected in the whole.”

“How does it work?” Grace asked, fascinated.

“It uses a contextual grasp of meanings, and processes them with human-level reasoning. The system is prompted by a series of estimation points, called GESTimates, and then it consults a massive remote processing facility to deal with your query. Then it connects the individual meanings by virtue of the context that the entire set of data points provides.”

Hart continued to explain as he led them to a data terminal. “Now, we’re still in development. I guess in a WIKI you always are. But what I mean here is, in spite of my every intention, this project has fallen off the rails somewhat in favor of other more crucial Halo projects. So it will be finicky. Lots of GESTimates won’t as yet have seen any contribution, and so won’t net anything. But if you manage to stay on track with your father’s thought processes, I believe your dad is trying to tell you he will have programmed the GES to ensure you get the answers you need.”

“So... he used the puzzles to give Davey the right nudges?” Grace

asked. "And these are going to be the GEstimates? But, what makes you so sure?"

"It's in his e-clip message." Davey answered for Hart. "Where? Why? When? It's following a W5 search pattern. So, we have to answer those, as well as Who? And What?"

"I guess there's only one way to find out," Hart said, and clapped Davey on the back for confidence.

At the terminal, Hart accessed the GES system and specified the search criteria as being the five Ws, then handed the terminal over to Davey. "Best we use a key entry. I don't know that voice recognition can offer us the precision we may need."

Davey moved nervously to the keyboard. The screen flashed: ENTER KNOWN VARIABLES and then displayed a tiny data entry window with only one word serving as prompt: Who =

The cursor blinked as Davey considered his options. He looked to Oliver Hart. Hart held his hands out, indicating the keyboard, encouraging Davey to follow his own instincts. Davey stood looking at the keyboard, afraid to make that bold first move.

"Don't worry, Davey. You can't go wrong. Worst thing that can happen is you won't get the answer you need."

Seemed like a pretty bad worst case scenario to Davey. But he was going to have to make a move at some point. He carefully typed: DAVEY RANDOLPH, and hit enter.

The screen blinked back immediately: GES ERROR: Who?

Davey thought about this a moment. If the information he sought was about his dad...

He clicked at the data entry window and typed:

Who = DAVID RANDOLPH

He held his breath, and hit enter. Again the screen responded instantaneously:

GES SPECIFY: Who = DAVID RANDOLPH: IDENTIFY

"Good, Davey. You're getting somewhere. Do you know your father's birth date... I can look it up if you need me to?"

"No. He left me a photo I could use to figure it out along with the e-clips. I needed it to get into the e-clip's HOLO message, too." Davey didn't think it necessary to confess to Hart that he had long before found the photo, and had used it to figure out his dad's birth date to hack into his mother's INbox. Davey entered his dad's IDentacard number next to his name on his next try, and waited what felt like forever to see if the data was accepted. Grace again patted him on the back, and he let out a big sigh when the screen rewarded him with the next prompt: What =

What indeed? Davey thought. "I have no idea what it's looking for

here,” he said pleadingly to Hart.

“You have to trust yourself, Davey.”

Yeah, great. Thanks for nothing, he thought.

“Well, maybe we need to think about what you are trying to do. In simplest terms,” Grace said helpfully. “Like, maybe it is *rescue*... or *travel*... I don’t know.”

“Or *launch codes*... or *tell me when to fly that damned Pod!*” Davey barked in frustration. Grace’s laugh, uncertain at first, helped to break the tension, and he smiled and shook his head.

Hart reassured him. “Try something. Remember, there’s nothing to lose. I am confident that your father has built in only one W5 framework to correspond with his identity. We just have to be able to work through the unfolding, step by step, and follow your dad’s thinking. It won’t let you go ahead if it doesn’t like the GESTimates you provide. There has to have been a relational entry made for each of the correct GESTimates—your dad will have made sure of that.”

Davey keyed: POD, and hit enter.

Davey was frustrated to see the GES’s instantaneous reply: GES ERROR: What?

“Think of the puzzles your dad left for you, Davey. Let them be your guide,” Hart encouraged.

“The puzzles... which did my dad have a hand in?”

“All of them, Davey. He had set out this road map ten long years ago. I was simply the vehicle for his plan.”

“The *othblgshezi* one you gave us, too?”

“Yes. And the GEOcaching game you played, that led you into the g0o zone... the box code that opened the g0o panel. The Webdings puzzle was my own doing, though. I expect it gave you no trouble?”

“Davey got that one, too,” Grace answered proudly.

Davey thought about Hart’s answer for a moment. “The box you gave me at Hartland with the Pod key in it?”

Hart nodded. “Yes. That too.”

Davey pulled the key from his pocket and rolled it around in his hand, hoping for inspiration. His thumb found the tiny number engraved on the key’s head and he looked down to inspect it. It read 0.36. Why the decimal? And the zero? Why not just .36 or 036? And then, it struck him! He typed three letters on the keypad.

What = GEO then hit enter.

The screen blinked. And another data entry box opened, reading: Where =

“You got it Davey! But... what’s GEO?”

He held out the Pod key for her to see. “It’s on the key. It must be my dad’s name for the Pod. GEO.” He noticed Grace’s puzzled expression and then turned the key upside down for her. “When you

have a word that ends in O in *othblgshezi*, you have to use the decimal. To make the zero appear. Otherwise, the calculator would just say GE. I don't know why it didn't occur to me before."

"GEO. Of course. It didn't occur to you, I'd imagine, maybe because you had no idea these puzzles were all interlinked?" Grace surmised.

"Or that they would matter so much," Hart volunteered, smiling. "I'm proud of you, Davey. You're doing really great."

"Yeah, Davey. Solid."

At least Grace's sentiments ring true, Davey thought to himself. But he didn't have time for the emotional distractions Hart stirred. He needed to find the next GESTimate... Where =

Thinking back on the puzzles, Davey said "This one should be easier..." He keyed in his response: BLACK HOLE, and hit enter.

Again the screen responded instantly:

GES ERROR: Where?

"I don't get it? That was the answer from the puzzle."

Then Grace spoke up. "Try WORMHOLE," she suggested. "It's more accurate, both to the joke, and to the realities of alternate universe travel."

"Okay," Davey said doubtfully, trying WORMHOLE next. He was thrilled when the next dialogue box appeared immediately, prompting: When =

Davey and Grace high-fived.

Davey stared at the blinking When = for a minute or two. "I think I know where to go with this one. In his message, my dad specifically said *the e-clips will tell you when*. He typed E-CLIPS and then entered.

The screen blinked back immediately: GES ERROR: When?

Aaarrrgh! he nearly screamed. "I don't get it! What does this thing want from me?"

Grace just shrugged her shoulders. Hart looked on edgily, as though, through the intensity of his focus, he could instill the correct response in Davey.

"Trust yourself, Davey," he offered as encouragement.

Hart's words sparked something in him. At a loss for what else to do, and with no harm in the trying, he retried e-clips. Only, this time, he entered it in the singular, as the clue his father had left had been confined to only one of the e-clips: E-CLIP. "Maybe I just need to refer to the one e-clip," he offered Grace by way of explanation, though he was somehow less than convinced that his father's personal message had been anything less than direct. But before hitting enter, he felt the nag of an unspoken hunch. He backspaced, removed the hyphen, and then retyped: ECLIP. "And maybe the punctuation is throwing it off."

The GES replied, but this time instead of an ERROR it said: GES SPECIFY: When = ECLIPTIC: CONFIRM

“*Ecliptic*? That’s the plane of the Earth’s revolution, or orbit, around the sun. Could it just be misreading my entry? Could it think I must have mistyped *eclip* when I meant to say *ecliptic*?”

“Oh, I’m not so sure about that, Davey,” Hart said, holding out what Davey instantly knew must be one of the Devices that Hart and his father had built. It looked to him, at first glance, like a large ONE. Actually, more like an ancient digital audio player called an iPod that his grandfather still listened to, arguing that his taste in music hadn’t changed in thirty years, so why should his music player. The Device, however, had four rings that spun to set the locations of the inner planets (Mars, Venus, Earth, and Mercury), and a display or readout that showed their geocentric ecliptic longitudes—each planet’s place on its path around the sun—that changed as the rings were spun.

Davey knew they were onto something. The proximity to an answer that mattered so much left Davey feeling giddy and ill, sending too much adrenaline coursing through his veins. But he still had the feeling that more lay hidden a few layers beneath where they were currently working. But where?

“My mother...” Davey said, stalled in thought.

“What?” Hart encouraged.

“Shhh,” Grace cautioned. “He’s thinking. Just give him a sec.”

“My mother. Read my dad’s message again, Grace.”

She lifted her ONE lanyard from around her neck and toggled to where she had stored the message Davey had transcribed for her: “You have all you need to find me. Your mother can mark the way. You know—”

Davey interrupted, “My mother. She has this tattoo—her and my dad both.” He thought for a moment about the tattoo, and the words listed underneath it. “It’s a bunch of concentric circles with symbols on the rings. Concentric circles—like the planetary orbits and Earth’s ecliptic!” he said, excitedly.

“It had some words to it, too.” Davey recalled them without effort: “*goddess hides the message... the warrior protects his king...both drawn to the one hailed true.*”

“That’s it, Davey. That must be it. Oh, David you are a clever, clever man,” Hart said, reverentially. “If your mother’s tattoo is the message... *goddess hides the message...* what is it trying to tell us?” Hart asked.

“My father said she marked the way...”

Davey felt the meaning of those words, scrabbling now, looking for its way out of the darkness. But he’d have to open the door more than this tiny crack if the truth was to find its way up to the light.

“Well, it seems clear enough to me: The *goddess* is your mom. She hides the *message*, which is this clue. The *warrior* is your dad, and I

suppose that would make me the *king*. He went into the alternate universe to protect me. To save me. And you, Davey... you must be *the one hailed true*. The one to which they are both drawn, as their son. The one hailed true, whose mission is to find the truth... to find the answers."

"Yes, Uncle Ollie!" Grace nearly shouted. "It makes perfect sense. But, I still don't understand how knowing how those clues *mark the way*. Davey's dad's HOLO said his mother would *mark the way*."

"No," said Davey.

"What do you mean, *no*?" Grace asked. Hart looked as though he were about to speak but Grace silently shushed him with her facial expression and by holding up her hand. She could see that Davey was in that place. The one that was more productive when left undisturbed, from which Davey needed to be left to emerge in his own time.

"No. That's not it... I mean, that's only part of it, maybe. Just one level. But there is more, somehow. I know there is," Davey said, and grew silent. It all reminded him strangely of something he couldn't put his finger on.

Grace and Hart waited in a painful hush.

"He's talking about the planets, isn't he?" Davey asked no one in particular. No one at all, really.

"Yes...?" Hart encouraged, though he seemed not to have yet grasped the intent or meaning of Davey's question.

"They're the planets, the four Naked Eye Planets you can see from Earth. Revolving around the sun, like us, in concentric circles. In their ECLIPTICS! He's tweaking us into thinking about the planets, by hinting to the Gods of Greek and Roman mythology they were named after. *Goddess... message... warrior and king...*"

"You mean, like *message* is Mercury? The Messenger of the Gods!" Hart said.

"And the *goddess* means Venus, the Goddess of Love. The symbol for both is even the same... a circle with a plus sign!" Grace said, excited to be a part of the unfolding of this mystery.

And then it occurred to Davey in a flash. Those symbols on the concentric rings part of his mom's tattoo. He'd never really looked closely at them, so much had he psychologically distanced himself from that tattoo. But they were the planetary symbols, he now knew with complete certainty.

"And the *warrior* is... what? Mars? They have the same symbol too...man and Mars... a circle with an arrow coming off it." Grace was still enjoying playing catch-up.

"Mars is the warrior, yes. Mars is the God of War," Davey affirmed. "And the *king* is Jupiter, the King of the Gods. So what about ...oh, I

see!”

“What?” Hart jumped in eagerly.

“The *one hailed true*! That’s not about *me*. That’s about the planet Earth. The only planet *not* named after a God. The only one not *hailed* after a mythological God, but after something *true*: earth, dirt, terra.”

“God, this is fu...uuh...flaming!” Grace blurted, losing herself. “Oh, jeez, sorry, Uncle Ollie! It’s just so exciting.”

“Don’t apologize to me, dear girl. You’re quite right. It is amazing... yes, *flaming*, even!” he said, smiling. Hart had clearly been won over by the moment.

“Now, Davey...what about the lay of those planets can you tell us? Your dad’s is a system of some enormous precision. I just can’t imagine what a schematic like a tattoo drawing could do to tell us when the planets will be so ideally aligned as to ensure a straight shot through the wormhole.”

“*The e-clips will tell you when*,” Davey muttered. He was unable to let it go. He felt compelled to heed the specificity of his father’s words, feeling that his dad had already proven himself a very particular kind of fellow. And could be expected to be all the more so, especially when something as critical as his own rescue hung in the balance.

“Yes. His HOLO said the e-clips will tell us when. But we need to know when based on a specific—and I mean micro-specific—alignment of these inner planets,” Hart clarified. “The e-clips led us to your mother’s tattoo, but that just can’t be enough. It’s not specific enough.” Hart was sounding frustrated.

“But my dad’s HOLO... it clearly said: The e-clips will tell you when.” He tried again, entering ECLIPS, in plural this time and still leaving off the punctuation, trusting his instincts. And trusting his dad.

Davey was frustrated to see that, again, he’d received feedback from the GES, but not the step forward he had been hoping for: GES SPECIFY: When = ECLIPSE: CONFIRM

Why did it seem to be getting so hung up on this, he wondered. E-clips, ecliptic, eclipse... but then he realized, it wasn’t hung up. It was trying to help.

“Eclipse? Is that what my dad said? I had just assumed he’d meant *e-clips*. But could he have been saying *eclipse*?”

“Could be, I s’pose,” Grace affirmed.

Davey could sense that light-seeking meaning scrabbling up from the dark again... and when illuminated with just one word—ECLIPSE—not e-clips: “That tattoo is a map... a map of when! The ECLIPSE will tell us when!

*“goddess hides the message,
the warrior protects his king,*

both drawn to the one hailed true," Davey nearly shouted.

"That clue—it's talking about *eclipses*. Don't you see? Planetary conjunctions?" Davey slowed down enough to explain: "There are two pairs of planets on my mother's tattoo that are in the same geocentric ecliptic longitude—in conjunction. It's a map of sorts, I guess you could say."

Davey held his hand out requesting Grace's ONE from her. He changed the interface to a 3D Tablet, popped her stylus up, and began drawing in the air a map of his thoughts. Hart moved closer, and Davey dropped to one knee so that they could both look over his shoulders and follow his work. Davey sketched rings and labeled them with planetary symbols. Then he began to draw lines connecting them.

"It's a map, but not to a place—to a point in time. A *when*... when Mercury is in conjunction with Venus, and Mars is in conjunction with Jupiter."

Grace encouraged him, "So, you mean that, when seen from Earth, one planet would effectively *eclipse* the other from the Earth's view?"

"Yes. The goddess *hides* the message. It's not just about the goddess or the message. It's about the hiding. As in planetary eclipse."

Hart was exuberant. "Yes... Yes, I see..." was all he could say.

"Yes... and the warrior *protects* his king. Also in eclipse!" Grace chimed in.

And, with that, Davey entered the GESTimate: When = ECLIPSE. The GES accepted it by providing the Why = prompt.

"Well done, Davey! Almost there now!" Hart was beside himself with enthusiasm.

Davey was so exhausted, his mind felt bent and rubbery.

"Only one left," Grace offered, helpfully.

Davey stared at the screen. He could think of a hundred—no, a million—*whys*. But for these purposes, he needed only one. To get the information he would need to travel through space and time to an alternate universe in search of his father, he needed just the one *why*. He reflected on his father's puzzles for a moment, and the answer seemed clear. There was only one puzzle left for him by his dad that seemed to answer the *why*. He typed his entry: Why = NEW ERA, and looked over to Hart. Hart nodded in agreement. He looked over to Grace. She tried an encouraging smile, but he knew she was nearly as petrified as he. Davey placed his finger on the enter key, shut his eyes, and hit it.

When he opened them, focusing on the screen text, he was surprised to read:

GES OUTPUT: How = ♀♂
GES RESULT: ?

“What is this?” Davey barked. “I thought it was supposed to tell *me* how? This is no help! And... what? It wants something more from me, like, it wants *me* to know the answer?”

“Now, wait a minute. Let’s see what we can make of this.” Hart moved in closer, and, staring at the screen, seemed to be willing it to reveal itself to him.

“Davey, it’s given you back the planetary symbols for Mars and Venus, right?” Grace asked.

“Right...?” he answered, his confusion showing in the tone of his response.

“So maybe it’s saying that, somehow they are important to the when?”

“Ummm, okay...” Davey said, pensively. Grace had twigged a thought in him, and he was sorting and shuffling, trying to make sense of it. “Important to the *when*... the timing. It had to do with Mars and Venus, each in conjunction with their closest planetary neighbors, Jupiter and Mercury, respectively. So that, from Earth, instead of seeing all four inner planets, you would only be able to see Mars and Venus, and both Jupiter and Mercury would be hidden behind. But ...” he trailed off in thought.

“But?” Grace urged.

“But there’s more. My dad’s puzzles. So far, we’ve used all of them except... except the first. The puzzle that unlocked the GEO key box.” Davey stood mute and stone-faced for a moment. “Oh, my God. That’s it! I mean, could it be?”

“Davey? Please.” Hart implored. “You have to let us in. Let us help. We’re too close now, son.”

“Yeah, uhhh, that box,” Davey answered, dragging his consciousness back from the deep recesses of his mind to the surface, where he could interact with the outside world. “But is that *how* it answers how...?”

“How *what* answers how, Davey?” Grace asked.

“After winning the lottery...” but he stopped and corrected himself. “After Dr. Hart had me *believing* I’d won the lottery, and me and my mom went through a whole bunch of testing and qualifying and stuff. The last thing I had to do was open this box with a puzzle code on it. Oh, how did it go now...”

Slowly, he recalled the box’s engraving for Grace:

“Three lines provide all the hint you need, ummm... one try will do... if you take heed... something about five letters... five letters bring your destiny... yeah, that’s it... the word you seek is plain to see. And then it talks about shapes... thoughts will take shape, you must rely... what do you figure... what will you try?”

“Okaaaaay?” she asked, not sure where he was taking this. Hart

touched her gently on the sleeve as though to shush her, now. He obviously had learned a little about how Davey's mind worked these last few minutes, and wanted to let Davey follow his thoughts uninterrupted.

Davey held up one finger as if to say *hang on a sec*. He quickly refreshed the 3D Tablet screen on Grace's ONE and picked up the stylus again. Hastily and reflexively, he wrote down the clue he'd just retrieved from his memory.

"But... how?" Davey muttered.

"What?" Hart nearly shouted, beside himself.

And, just like that, Davey knew.

Every puzzle, every cryptic conversation he'd had with Hart, and every twist and turn flashed before his eyes. And, with a shudder along his spine, he knew. In his heart of hearts, he knew.

There was only one thing to do.

"That puzzle," Davey said. "The answer was ANGLE. Sooo, now we put in ANGLE, I guess..."

Davey watched Hart intently for his reaction. Watched his face and his every expression. And, just as he'd expected, predictably it did fall.

"Now, let's just think about this a minute," Hart stalled.

"What's the matter? Why won't you let me put that in the GES?" Davey asked. Grace looked at him probingly. He was behaving so oddly. She knew he was up to something, but she had no idea what.

Hart hesitated. Boggled down. But would not, or could not, explain why.

But no explanation was required. Davey already knew why.

"It's not ANGLE, is it?"

"Well, I..."

"Jeez, why didn't I see this before?"

"Davey?" Grace implored.

"He's *tried* that already. Haven't you? And it didn't work. That's why, all along, he's been watching me, including me. Isn't it, Dr. Hart? Tell her."

Hart mouthed an awkward, silent response, but had no words for Davey.

"Dr. Hart still needed me. If he hadn't—if he'd managed to get this far on his own—he never would have bothered including me and my mom in this, isn't that right Dr. Hart?"

"Now, Davey..."

"I never did win the lottery, of course. But if you'd have been able to do this without me, you never would have brought me along at all, would you?"

Grace looked shocked. Her eyes ping-ponged between the two men that mattered so much to her, searching for one of them to reveal the

truth.

“And you let me in, only because you had to follow me. And get your hands on these.” He laid his palm open, holding out the e-clips between them.

“Of course, the information on the e-clip was yours alone. Your father had made sure of that.”

Yes, and no wonder, thought Davey. “You’d solved all the puzzles already, of course, hadn’t you? Had you even tried the GES without me, but gotten stuck? What am I saying, of course you had.” Then he looked at Grace. He saw the confusion and hurt on her face, and was conflicted.

But it *was* time for the truth.

“Would you have gone without me if you could have, Dr. Hart? Would you have gone, with someone else who’d have no concern for how my father might get home?” Davey was ill at the thought.

Hart said nothing.

“It doesn’t matter, anyhow. I’m here now. And you still need me. You need me to get you over there. And I need to bring my father back. So are you going to tell me the answer, Dr. Hart? Or, perhaps you’d just rather hear it from me?”

Davey sank back into his thoughts. And, beside him, Hart remained silent, knowing that to say anything now would only confirm the dirty hand he’d been dealing.

Davey’s mind flipped back through time. He remembered being handed the velvet pouch, the adrenaline rush of opening the pouch and removing the box, and the knowledge—the certainty, both sickening and thrilling—that everything would hinge on one of his beloved puzzles. Little had he known.

He picked up the stylus again. Remembering the box layout, he scratched again a rough text on the 3D Tablet. Under the three lines of puzzle clue, he added the alpha pad. He squinted with effort, calling up his photographic memory to piece a recollection of the box’s alpha keypad together. The first fifteen letters of the alphabet, he remembered. A through E on the first row. And a jumble for the next two. He’d composed (though hadn’t then had call to use) a mnemonic for those muddled two lines:

Is Not Kansas Like Home
Jokes My Guy From Oz

A	B	C	D	E
I	N	K	L	H
J	M	G	F	O

Davey's attention sank back deeply into the screen.

"Try. *What will you try?*" Davey mumbled.

"Davey, I'm sure Uncle Ollie—" But Hart silenced her again.

"That puzzle. The answer was ANGLE."

Hart nodded. "But what does that have to do with the *How* we need?"

"Oh, you have got to be kidding!" Davey berated himself. He'd missed the obvious.

"What?" Hart nearly shouted, but Davey ignored him.

"*What will you try?* Try? Try ANGLE. Triangle... as in triang-ulate? Oh! Oh, you're going to love this! You know what? We never used the last line of that tattoo puzzle. Both drawn to the one hailed true? Triangulate Mars and Venus with Earth on the date of the conjunctions. With a line drawn to Earth through each of the conjunctions, we could triangulate! It would provide us with two bearings. Would that be our launch code? The two bearings? The angle of the triangulation?"

Already, Hart was busy at the workstation. "I'll search the OMNI for the *EPHEMERIS TABLES*. They'll provide us with a listing of the assigned places of celestial bodies at different intervals. And will tell us when this concurrent conjunction is going to happen. Though I *think*—I'm pretty certain—the Mars-Jupiter conjunction is a reasonably rare one."

"Maybe you don't need to." Davey moved to the keyboard and Hart moved aside for him to take it over. He keyed in: TRIANGULATE in answer to the GES RESULT: query.

Immediately the system offered the following final response: GES FINAL OUTPUT: 18SA24 29AQ56 22SQ07 33 108 39

"Good God! Well... there you have it! Our GEO launch code, ladies and gentlemen," Hart said with certainty.

He returned to the computer and re-opened the other window, continuing his search for the Ephemeris Tables. "And, there, young man, is our launch window."

MARS-JUPITER CONJUNCTION
(GEOCENTRIC TROPICAL ZODIAC)

DATE	TIME	ARC	MARS	JUPITER
MAR 20, 2020	11:36 AM	000	22CP49	22CP49
MAY 29, 2022	10:31 AM	000	03AR19	03AR19
AUG 14, 2024	03:22 PM	000	16GE40	16GE40
NOV 16, 2026	06:24 AM	000	25LE53	25LE53
JUL 19, 2029	05:22 PM	000	19LI21	19LI21
SEP 28, 2031	11:45 PM	000	21SA59	21SA59
DEC 01, 2033	09:59 AM	000	29AQ56	29AQ56
FEB 18, 2036	01:02 AM	000	13TA49	13TA49
MAY 22, 2038	10:24 PM	000	26CA12	26CA12
SEP 28, 2031	11:45 PM	000	21SA59	21SA59
DEC 01, 2033	09:59 AM	000	29AQ56	29AQ56
FEB 18, 2036	01:02 AM	000	13TA49	13TA49
MAY 22, 2038	10:24 PM	000	26CA12	26CA12
AUG 18, 2040	02:29 AM	000	02LI16	02LI16
OCT 30, 2042	04:10 PM	000	05SA10	05SA10

MERCURY-VENUS CONJUNCTION
(GEOCENTRIC TROPICAL ZODIAC)

DATE	GMT	ARC	MERCURY	VENUS
APR 19, 2024	09:01 AM	000	17AR33R	17AR33
JUN 17, 2024	12:44 PM	000	00CA20	00CA20
AUG 08, 2024	03:13 AM	000	03VI44R	03VI44
MAR 11, 2025	10:57 PM	000	08AR48	08AR48R
NOV 25, 2025	01:59 AM	000	22SC46R	22SC46
JAN 29, 2026	10:18 AM	000	14AQ57	14AQ57
FEB 28, 2026	05:33 AM	000	22PI15R	22PI15
OCT 07, 2026	00:12 AM	000	08SC13	08SC13R
JUL 01, 2027	09:24 AM	000	27GE56R	27GE56
AUG 11, 2027	06:31 AM	000	18LE12	18LE12
OCT 11, 2027	09:33 AM	000	04SC01R	04SC01
MAY 25, 2028	00:59 AM	000	15GE49R	15GE49R
JAN 23, 2029	06:23 AM	000	19CP00R	19CP00
MAR 27, 2029	02:55 PM	000	08AR11	08AR11
MAY 05, 2029	10:03 AM	000	26TA10R	26TA10
JAN 23, 2030	04:59 AM	000	08CP55	08CP55R
SEP 05, 2030	09:12 PM	000	01VI34R	01VI34
OCT 07, 2030	01:22 PM	000	10LI58	10LI58
DEC 10, 2030	00:11 AM	000	00CP29R	00CP29
JUL 25, 2031	06:52 PM	000	25LE55	25LE55R
MAR 27, 2032	04:58 AM	000	19PI36R	19PI36
MAY 20, 2032	09:11 AM	000	26TA25	26TA25
JUL 16, 2032	03:06 AM	000	06LE09R	06LE09
APR 07, 2033	07:59 AM	000	22PI34	22PI34R
NOV 05, 2033	06:54 AM	000	28LI36R	28LI36
DEC 14, 2033	10:26 PM	000	18SA24	18SA24
FEB 07, 2034	10:06 AM	000	26AQ54R	26AQ54
NOV 02, 2034	00:02 AM	000	22LI20	22LI20R
JUN 07, 2035	10:25 AM	000	29TA20	29TA20
JUL 13, 2035	02:45 AM	000	12CA58	12CA58
SEP 20, 2035	10:29 AM	000	08LI38R	08LI38
JUN 12, 2036	10:48 PM	000	02GE11	02GE11R

Davey cross-referenced both tables. When seen from Earth, Mars would eclipse Jupiter on December 1st, 2033. And Venus would eclipse Mercury December 14th, 2033.

“Two days from today. Looks like we have about two weeks, beginning 09:59 in the morning on the first. And that is Greenwich Mean Time, or *Universal Time*...” Hart paused, smiling.

“What are you smiling about?” Grace asked.

“Universal Time. It just struck me: the absurdity—the audacity—of calling our insignificant little planet’s meridian time Universal.”

“So... with our current geosynchronous orbit we keep Eastern time. That puts us five hours behind UT,” Grace calculated. “So, from about

5 A.M. on the 1st of December 'til 5:30 P.M. thirteen days later.”

“Our window of opportunity,” said Hart, serenely.

“Can we be ready to go in two days? My dad said to come as soon as I can. I want us to be at that wormhole at 5 A.M. on the first.”

“Sure,” said Grace, confidently. “We’ll make it happen.”

“No need to rush. Let’s get you both the training you need. Our window is nearly two weeks —”

“No. We leave on the first. My dad said as soon as I can and that’s what we’re going to do. Alright?”

It wasn’t a question.

23: SYZYGY FOR U AND ME

We don't receive wisdom, we must discover it for ourselves after a journey that no one can take for us or spare us.

Marcel Proust: (French) Novelist and Existentialist

Looking out a tiny window—a window as thick as it was round—they marveled at the big blue marble, and the starry firmament sparkling and trembling on its velvet tapestry.

“Incredible,” Davey whispered. “That we are up *here*... you know? That mankind can achieve such greatness.” Davey all of a sudden felt silly; that leaky valve that allowed him to express thoughts not yet well considered. Out of context, out of his mind and into the aether... His ears flushed red.

But Oliver Hart must have read his discomfort, because his answer was so on point: “We’ve all achieved in our own way, Davey. I can’t tell you how proud I am to see you’ve made it this far. I know it hasn’t been easy.”

“Well, in truth, it hasn’t been that hard, really. I mean, I had a lot of help.”

“Yes, my dear Grace. She’s grown into a splendid young woman herself.” He turned his chair to face Grace where she sat, in a quiet corner of the secret space where Grace’s parents had cloistered Hart away in one of the closed-off sections of the Halo. He rolled over to Grace and gave her a warm pat on the shoulder. She smiled lovingly in return. Davey knew how devastated she had been at the loss of him, and how much she had missed him. “But don’t sell yourself short. Each of those puzzles you conquered is easier looking back on than any one of them was in the moment,” Hart said. “No?”

Davey had thought a lot about how close a call each of the puzzles had felt, in their moments. How he’d had to strain to hear the little voice inside him that seemed to nudge him in the right direction. How easily, had he fully known the stakes, could he have blown any one of them? Knowing what was hanging in the balance would surely have hung him out. Made him try too hard and second-guess himself and stickhandle the process, rather than allow him to surrender to his instincts, as he had.

“Well, sure, I suppose,” he answered at last.

“It’s a lot like life, Davey. In our lives, we will each make choices that will profoundly affect us. Change our futures and change our lives. I can’t imagine in your young lives that you have met, yet, too many decisions, if indeed any at all, that you feel might become great regrets. Certainly, I hope that’s the case. My first great regret, and, in fact, probably my only *true* regret, is the one that led me to this.” He held his arms out, palms up, and swept them in a way that drew attention to his wheelchair.

“But, my mom told me... she told me it was an accident—your injury,” Grace said.

“Yes. An accident. But the result of an act of foolishness. And, to my abiding regret, one for which I was most certainly in the possession of better judgment. I fully understood the consequences of my decision to dive from that rock ledge into the swimming hole that day. But I was arrogant or foolish enough to imagine that those consequences would somehow not apply to me.”

Davey thought about their behavior going into g0o alone, and how risky they had known that could have been. He had known better, but had allowed himself to be influenced by his friends. And his own selfish desires. He blushed again.

“But I did not listen to that voice that told me not to dive into the swimming hole. That we hadn’t had quite enough rain that bitter, arid summer.” Hart’s gaze drifted off pensively.

Davey took the opportunity to steel a glance at Grace. She was looking back. The attentiveness of her look had been replaced by sorrow.

“But life isn’t just about reflection,” Davey said, feeling his way slowly through the thoughts and emotions he was trying to express. “It’s about being brave enough to make the hard choices right now! In the present.” Not that rescuing his dad felt anything like a choice to Davey. It was as essential as breathing to him now. But still, it meant selecting to follow a certain road that, once chosen, closed all other paths.

“Yes, Davey... too true. In particular, the hard choices. The ones that promise messiness and uncertainty. But maybe also hard-won happiness, no? It is only by our willingness and ability to make these brave, hard choices, that we are truly alive,” Hart offered.

Davey was silent, lost in thoughts he had no desire to share.

“Like your dad, Davey,” Hart began tentatively, continuing only when Davey offered him, however grudgingly, his attention. “I know you must be very disappointed with me on that score. And I can’t say that I have any right to blame you. I was selfish. I gave not a care—not really—to the struggles you would endure while I usurped your choice. And your right to have your father with you. And took him to

advance my own personal cause.”

“Yuh think?” Davey said, sarcastically.

Hart, in his wisdom, or cowardice, changed the subject. Back to the one on which they had met extensively over the last twenty-four hours: their trip into dimensions beyond their bubble universe. The trip that would take them to another world.

In the few hours that had passed since they had discovered the Pod’s launch code, Davey had spent pretty much every minute going over every bit of reference material available on the Pod his father had christened GEO. Though, truthfully, it seemed there was little “flying” to be done. Davey would only have to help navigate somewhat out of the Pod bay. Because the Pod used electromagnetic zero-point energy in its propulsion, it had to be far enough away from the Halo when the engines were engaged to not get stuck in its own magnetic attraction to the Halo.

So Grace, in the control room, would essentially drive them out of the launch bay. And with tiny external thruster craft, which she controlled, would push them into outer space, like a pilot ship’s harbor escort. Until they were far enough from the Halo to safely engage their giant magnet engine. Then, the remote navigational systems would take over. Hart himself would program the wormhole’s location into the Pod’s remote navigational system that Grace was in charge of. Shrouded in anti-gravity, the wormhole would treat them like a foreign object, and would propel them through and out the other side. And then—in a perfect world (or was that, many perfect worlds?)—Davey would be assisted by his father’s hand at the other set of remote navigation controls on the other Halo. Finally, Davey would be needed again, to bring the Pod to a landing in the Pod bay in the parallel world’s space station.

It sounded deceptively simple but was infinitely complex.

Wormhole travel was in no way like anything any of them had experienced, Hart reminded them. The propulsion forces necessary to travel in outer space weren’t as extreme as the three-stage rocket-fired travel that had blasted them out of the Earth’s atmosphere. Because they were no longer in the Earth’s gravitational environment, the Pod was able to use zero-point inertial propulsion to move quickly but gently through space.

The time spent in the Pod would be surprisingly short, given that the wormhole was doing all but the tiniest bit of their “traveling” for them. Even cabin pressurization and climate control were unnecessary. The cabin pressure would be set while in the Pod bay, and easily maintained for the duration of their short, yet inconceivably long, flight. The Pod carried the minimum technology so it could be the very smallest possible size.

Once on the other side, Hart informed Davey, they would send out a beacon and try to locate the alternate Halo. All things going according to plan, someone—ideally Davey’s father—would be there, at the controls, to bring their Pod back into range where it could be effectively hooked and reeled in, so to speak.

“What if nobody is there?” Davey asked, in spite of how hard it was for him to contemplate the very possibility, with all it implied.

Hart had every expectation that Davey’s father would have bequeathed this job to someone else, he reassured them, in the event of his untimely passing. “But...” Hart said, “if we *do* get to the other side, and for whatever reason there is no one to reel our Pod in, we’ll have to turn around immediately and proceed back through the wormhole and back to Grace.”

Grace nodded that she understood.

Davey sat mute.

Grace would not only be needed to help with the launch and any potential immediate return, but also would stay wired to the Pod bay systems, awaiting to assist in the Pod’s return, for the full thirteen days in which the wormhole was due to be passable.

The three worked out every possible scenario. What would they do if they found no space station on the other side of the wormhole? An immediate return trip was of course the only viable solution. What if they got to the space station but learned that Davey’s dad was not, for one of any number of reasons, awaiting them? Hart would send Davey home alone.

“But, I’m not sure I can make the trip back alone!” Davey protested, wishing, and not for the first time, that Grace could somehow make the trip with him.

But Grace was needed here. Not only technically, to help with the launch. She would also stay behind as the one link between this world and the other. She was to remain, for a time, the only one who knew the truth of what Hart and Davey were up to. And her role—if worse came to worst, difficult to contemplate as that was—would be to close the loop. To advise Davey’s mom and her own parents of a mission gone awry, if the two failed to return by the appointed hour.

“That’s it, then,” Hart concluded. “All great plans arise out of necessity,” he told them. They would meet the next morning at the entrance to g0o at three A.M., which would give them a couple hours of preparation time before their launch window opened at one minute to five.

Davey had been struggling to face his mother on their daily calls these last couple of days. He’d never been any good at keeping a secret. And she was such a good read of him and his mood. Hiding

himself from her would have been easier than hiding his secret. So Davey had pretty much done just that. He'd hidden out, either in his room or in Hart's secret lair, as he and Grace had quickly fallen into the habit of referring to it. Studying and planning and worrying. He had only been able to cope with very brief phone calls with his mother.

And, yes, there had been some crying. But only when he was alone, in his room, for that was when his fear was allowed to find its voice. The thought that he might, just hours from now, see his father... The thought that he might, after saying goodbye last night, never again see his mother... It overwhelmed him.

But then, he would think of his dad. And then anything seemed possible.

Before leaving to meet Hart and Grace at the entrance to g0o, Davey snuck through their still dark home into his mother's vacant bedroom.

He placed an envelope on her empty dresser, knowing that his disappearance would launch an investigation and the envelope would be given to her then. He hesitated for a moment. How could he ever hope to explain his decision to her? No, it was impossible. He wiped his tears away.

"Thankfully, the damage you detected on your unsanctioned trip up here that afternoon was minimal," Hart said, as they floated towards the Pod bay doors.

Davey was suddenly gripped with a cold fear, remembering they still had no idea who was behind the sabotage they had discovered.

Davey removed the key from his pocket. The same key he'd been carrying since opening that velvet-lined box, what now seemed like eons ago.

He slid the key home.

The doors glided soundlessly open.

Awesome.

"It looks like... I dunno... like a soccer ball or something," Grace said, trying to break the nervous tension.

"Nearly," Hart conceded. "A familiar shape, to be sure. But a soccer ball is a truncated icosahedron made spherical: a combination... part, the six-sided faces of an icosahedrons (the white bits), and part, the five-sided faces of a dodecahedron. This is a Poincaré dodecahedron... Twelve pentagon-shaped faces."

"It's boost!" was Davey's only addition to the discussion.

Hart led the two over to the system control panel, a carbon copy of which Grace had been running in simulation these last few days on the Halo.

Hart removed the Device from his breast pocket. His hands moved

in strange patterns over it. An odd clicking sound emanated, like Morse code, only repeating the same three notes over and over. Once you felt the rhythm of it, it seemed as though it had started on the third note and was finishing on the first and second. Da, da da Da, da da Da, da da...

Hart plugged the Device into the console, allowed it to download something, and then removed it and handed it to Davey to program his bit.

“Over to you, young Davey,” Hart pronounced, his hand sweeping the control station.

Davey stepped forward and squared his shoulders. As he began to enter the launch code, his throat suddenly burned with a bile-raising fear. In their few days of gearing up for just this moment, he hadn’t thought that they might want to check this was the *right* code.

His mind flashed on the now all-important puzzles. And his stomach flip-flopped in response. What if he’d blown any one of those puzzles?

He looked over at Hart, who offered a virtual nudge with the wave of his hand.

What was he thinking? Of course this would work. Hart wouldn’t have come this far to overlook such a trifling matter.

Besides, it was too beautiful. All too beautiful. The way everything fit so seamlessly together. The way, it seemed to him, it should be.

He trusted his father, and trusted himself.

Davey worked on instinct, spinning the click wheel until each of the rings represented space coordinates. Then, when prompted, he punched in the triangulated angle code: 18SA24 29AQ56 22PI07 33 108 39

Again, Hart fit the Device into a dock at Grace’s controls. The control suite blinked to life, filling each of its numerous screens with an array of flight control information. Davey noticed Grace’s eyes light up in response, and moved aside for her to slide into the seat in front of the controls.

“It’s all good, Grace?”

“Hunh?” she grunted distractedly, and then pulled her attention away from her station. “Oh...oh, yes. It’s all good.”

“And on that note,” Hart smiled, “are you ready to fly me, young man?”

“Ready as I’ll ever be,” Davey answered.

Hart then gave the Device back to Davey to dock on the small dash of the Pod once they were onboard.

The side of the Pod folded invisibly away to allow Hart access. Davey watched in awe as one of the two minimalist and compact seats folded into the floor, making room for Hart’s chair to be bolted in its

place.

The two were strapped in and all systems were verified.

Davey looked at Grace, who tried to smile encouragingly. But there was a terror that lay not-so-well concealed beneath her surface. Grace hugged Hart, and kissed his forehead. By the time she had turned her attention to Davey, her eyes were shining and wet. She bit her lip, and then, allowing impulse to make her decisions for her, pressed her lips firmly to Davey's. She caught him so off balance that, later, he would have no recollection of whether or not he'd kissed her back.

Davey blinked through the liquid blur that obscured his vision, and closed the Pod hatch behind Grace. Taking a deep breath himself, he initiated the cabin pressurization as soon as he'd heard the thunk that confirmed the hatch was locked.

Grace's voice came over his headset. She was good to go. Davey acknowledged, and looked to Hart, who offered him his own thumbs up.

Davey went through the studied pre-launch sequence while, behind her own set of controls, Grace looked after the opening of the Pod bay doors. She then began to navigate the small craft into outer space, small thruster craft firing on either side to direct the tiny Pod. In truth, it was a much simpler process than Davey might ever have anticipated, though the tension of the unexpected still had him sucking hard on his ORBITZ candy.

During their preparations, Hart had explained that there was every chance Davey may find himself also existing in this parallel world. Indeed, that he might even encounter this other Davey on the space station. This could not be allowed to happen, Hart had stressed. Hart wouldn't suffer the same paradox concern, with his life already so immeasurably different from the Hart of his father's alternate universe. But, to Davey, the danger of a paradox meant that he had to strictly avoid any situation that might bring about a meeting with alternate Davey.

But there were no guarantees that he and Hart wouldn't lose sight of one another while in the parallel world.

So Davey had come up with a simple yet practical solution. He would use the color of an ORBITZ candy (his favorite: *slimeball* green) to stain his mouth for twelve hours. This would make him immediately recognizable to Hart when in the parallel universe. And would ensure that, if they did split up, Hart would at least be able to recognize the right Davey.

Grace's pilot crafts extinguished their thrusters. It was time for control of the Pod to now be passed to Davey. As Davey ran through the rehearsed sequence of tasks that would turn the Pod over to zero-point field inertial propulsion, he noted that Grace's thruster craft had

disengaged from the Pod and were hovering close by. He smiled as their engines fired off three quick blasts of fiery exhaust before the vehicles spun on a dime and few off, back in the direction of the Halo.

“Goodbye to you, too, Grace,” Davey whispered as he flicked the remaining switches. There was an initial lurch of momentum, but their speed was impossible to discern. He quickly relaxed into manning the switches and knobs during their gentle glide through inky darkness. The actual steering was being done by the Pod, based on a trajectory set by Hart’s Device.

Hart had said it would be a short ride. Hart’s Halo had been set to orbit where it had, not only to eventually move to a geostationary orbit to connect by space elevator to HART facilities in Brazil, but precisely in order to be close to the wormhole’s entrance. But Davey was shocked by just how brief the ride was.

And yet, here they were already.

Davey felt enormous relief. And then he felt an enormous shudder. It resonated within him. He hadn’t been expecting this! And hadn’t prepared himself mentally for it.

But before anxiety had the chance to take a hold of all his senses, he quickly manned the switches and controls for his brief run at the helm.

Davey could sense their approach to the wormhole, with the evanescent shift of light at its entrance. As they drew up on this surreal sensory spacescape, fear rose in Davey’s throat. He looked over to Hart, and found him pressed back hard into his seat, eyes closed tight.

As though passing through some invisible barrier, they felt the wormhole begin to deflect the Pod. Davey engaged the thrusters, which responded so quickly that he was pushed solidly back into his chair. A dangerous and deadly drama followed, though one only momentary in duration. And then, Davey knew, they had entered the wormhole.

Now, inside the throat, Davey’s work was all but done. The undeniable forces of nature took over. The repulsion of the anti-gravity threading the throat of the wormhole, in which they were now caught, made GEO’s own thrust unnecessary and caused the Pod’s drive to cut off automatically.

Blink, breathe, beat. No physical reflex, no matter how primal, could be taken for granted right now. And, somehow, giving his full attention to these instinctive tasks took some of the helplessness from Davey’s terror.

In a split instant, Davey felt a lurching at his very core. It was an overwhelmingly physical sense, like the kind you might get when cresting a hill. On the other side of this instant, was a dramatic

descent into deprivation again. But because this was a relatively small wormhole, the intensity of the shift in force the two passengers experienced was also, gratefully, relatively small.

The process repeated itself in reverse on the other side, where the thrusters again automatically engaged to push the Pod toward the exit of the wormhole, with Davey at the yoke.

Davey marveled at the sheer audacity of the Pod. It had been engineered to conform to the mathematics of the universe. Building for space meant trusting the mathematical models of cosmology as though they were absolute truths and certainties of reality.

The thrusters were timed to immediately disengage when the wormhole's own repulsion sent them popping out the other end like a cork.

For a moment, Davey allowed the Pod to float freely in space. The new realities that were assaulting his mind needed time to catch up with those his body was feeling.

Inhaling deeply, he slowly worked to establish his equilibrium. He checked in with Hart, reassuring himself that he was also fine. Hart, still seemingly gripped by fear, at least had his eyes open now. And he gave an uncertain thumbs-up in response to Davey's inquiry.

The thought of his father brought him back to this unreal reality. He steeled himself, transmitted his own beacon, and waited. The world's longest wait.

Allowing the navigation now to work in reverse, they soon came upon, looming ahead in the distance, a perfect replica of Hart's Halo! It looked identical in every way to the one they had just left behind. Davey's rational side was convinced that they hadn't traveled anywhere. He was sure that, on that Halo, lived his Grace and the rest of his crew.

They immediately located the Halo's beacon. Then, suddenly, shockingly, his control systems registered a connection! And before Davey could react, they were already underway, destination: Halo.

Nervous excitement and anticipation began to replace fear and anxiety as Davey's overriding emotions.

An uneventful landing in the Pod bay, and Davey's urge to bail from GEO was irrepressible. Hart was in the middle of speaking to him, but Davey could hear nothing. Davey was busy unfastening himself, and providing Hart with the small courtesy of his assistance, before jumping up. He quickly checked the Pod bay's compression before releasing the hatch and pushed himself, floating, overboard, leaving Hart's commanding voice in his wake.

Davey was suspended, nearly frozen in time and space, taking it all in, as the Pod's foldaway gangway unfurled. Hart drifted out,

propelling himself with breaststroke-like motions.

“It’s the same. Everything’s the same.” Davey said, awestruck, sensing Hart was now behind him.

“In every way I can see,” confirmed Hart. “In every way I can see.”

24: ON A BUTTERFLY'S WINGS

In all chaos there is a cosmos, in all disorder a secret order.

Carl Jung: (Swiss) Psychiatrist, whose approach to exploring the human mind involved studying the psyche through dreams, myth, art, world religion and philosophy

He was an older man, with rugged skin and white-grey hair. But his eyes were vigorous, alert and purposeful. Clear blue.

Oh, no mistaking it: This was his father. From the moment he'd laid eyes on him at the controls to the Pod bay. And still now, seated in David Randolph's personal quarters, there was no doubting that fact.

His father. He was blown away.

Hart was doing most of the speaking. And mostly to his dad. Davey found himself drifting in and out of the conversation. He was kind of snapped out of it by his father's touch—a brief pat on the shoulder. And then his glowing smile, that emanated such warmth.

"I'd like to say I hadn't a doubt you'd be here, Ol. But you know how crazy a tightrope walk this thing has always been. Of course, after nearly forty years in this reality, I had long since resigned myself to this version of my life. But never without the hope... Never." There was another one of those mile-wide smiles for Davey. There was something enormously recognizable in that smile. And in his strangely familiar habit of rubbing a hand over his short white hair as he listened, thinking. He was a gangly man. Long-legged and thin.

Davey knew the uncertain, awkward smile that plastered his own face couldn't possibly convey the depth of his feelings, but relied on his father's instinct to interpret the rest. When he remembered the bright green ORBITZ he had used to stain his mouth, he withdrew his smile self-consciously.

"You did a remarkable job, Davey. Really, truly... remarkable. I couldn't be more proud."

"Thanks," Davey thought he said, unsure if the word had indeed managed to escape his lips.

"Sorry, kiddo. I don't suppose you thrill to being called Davey anymore, do you? I know that by the time I was your age I was trying hard to shake the 'Davey' thing. I guess old habits die hard."

"It's okay. Really." Davey realized he had very nearly called his father *Dad* just then, and had quickly caught himself, uncertain

whether he was yet prepared for that degree of familiarity. His dad was a virtual stranger, with whom he shared both a name and some DNA. “I’m kind of used to it,” he said, shrugging. “Mom—uh, most people in fact—still call me Davey.”

Davey was feeling nervous and fidgety and couldn’t seem to sit still any longer. So, as the two men continued to talk, he hopped from his seat and wandered through David Randolph’s spacious quarters.

“There is another David Randolph, of course. And he has a lovely wife and son, whose company I’ve enjoyed enormously over the last few years,” his father said. “Not the same thing as being with my family, son. Not in any way. But I make the best of it, under the circumstances. Turns out, the fact that I came to this world as a thirty-year-old man in 1993 instead of having just been born in 1992, meant that I could interact freely with this younger version David Randolph without fear of the kind of paradox we presumed inherent in time travel. Not a luxury we can afford you, though, Davey. Your alternate self is identical to you in every way I can see. Except, of course, for the foul color of your mouth!” he said, smiling. “So we’ll have to make sure you don’t cross paths while we set about organizing our return.”

Davey looked out the window of his dad’s accommodation.

It had been early in the morning when he and Hart had arrived. Davey’s dad had managed to sneak them quite effectively from g0o to his home on the Halo, using the same special harness to transport Hart’s wheelchair to and from the g0o zone they’d used on his Halo. The dim early morning light, faked by the Halo’s artistic lighting and architecture, had grudgingly given way to an imitation early-rising sun. And now, though still not quite six in the morning, the Halo’s streets were beginning to churn with pedestrian traffic. Clearly, this Halo had been populated to capacity.

Davey overheard his father and Hart’s conversation. “We could be ready to leave at a moment’s notice. We’ll just need you to calculate and set the way points for the entrance to our wormhole from here.”

“Hey... wait a minute. It just occurred to me. If only Dr. Hart can measure the gravitational wave signature to locate the appropriate wormhole, why couldn’t the Oliver Hart in *this* universe have done that for you, using your Device? Even all those years ago? And then sent you back to our world... our world in 2023, even?”

Oliver Hart seemed embarrassed. “There were a few factors at play, Davey. Finding the right opportunity, another time when the planets were aligned just so, to have allowed a straight shot through, was a challenge. And there had always been the need to get me over here, first. Because of my condition, that was something that couldn’t be accomplished until the Halo—both Halos—were built in their entirety. And we needed your dad here to ensure that everything

remained on schedule on this end, while I concerned myself with events in our world.”

Again, Davey felt stifled and frustrated by the degree to which this entire enterprise had centered on Hart’s personal ambitions.

“Actually, Davey, I did think about that. Initially, when I first agreed to come over here. And Ollie’s right—about finding the right time separation. Once my mission here had been accomplished, and the space station and Pod were on track to completion and far enough along to accommodate my considering coming home, there was only one other chance of a straight shot. Check your Ephemeris Tables again. There were only three Mars-Jupiter conjunctions—the one that is most key to setting up the right gravitational environment—between when I came over and today. And none of them is within a couple of weeks of a Mercury-Venus conjunction, which we also required to set the ideal circumstances. To hold the throat of the wormhole open while aligning it in such a manner as to allow for a clear shot through. I was able to use that 2024 traverse to get over here. This was our best bet to get me back home. Our one sure shot.”

Talk about cutting it close? Davey shuddered to think that this one opportunity had represented his dad’s one hope to get home. The window opening, and just as quickly slamming shut, forever. Or at least for the duration of his father’s lifetime.

“But time is just a notion, Davey. So I waited, knowing this one opportunity would soon enough be here. And I trusted. Because faith was all I had left. Faith that you and Ollie would put it all together. That you would arrive, just as you did.” David Randolph’s confident expression was one of pride.

“But there’s more to it than that, Davey,” his dad added, resettling uncomfortably in his seat. “There’s more reason to why I waited instead of hopping in the Pod on this side and, with the right wormhole’s coordinates established, crossing over to you.”

Hart looked confused.

“Davey, are you at all familiar with Chaos Theory? The branch of mathematics that suggest that small changes, even those as immaterially small as the flap of a butterfly’s wings, can set off a ripple effect? And the ripples give rise to more profound changes than we can imagine? It’s the reason I was so adamant with Ollie that he not interfere with your upbringing. So that I could keep you as close to the boy you would have become without those outside influences that would undoubtedly have changed you.”

“What are you driving at, David?” Hart asked nervously, and Davey wondered what he had missed.

“Oh, Oliver...” his father said, forlornly. But then paused, looking down, clearly not knowing how to proceed.

Hart waited, saying not another word. Instead, his eyes searched Davey's father's face.

"I'm so sorry, Ollie. But, this space station.... It *isn't* named Hart's Halo, though I thought long and hard about that, I can tell you." He sighed audibly. And then steeled himself to continue. "But it isn't. It's called SPIRIT. Short for SPIRITorus, because of its donut, or torus, shape. You see, for it to have been named *Hart's Halo* would have left me with something to explain to the world. Why I'd named the space station after a boy; and one I had no logical explanation of ever having known. A young man. Who'd passed away at the age of twenty-one, the victim of a reckless and senseless car accident."

Hart's eyes spoke in the wordless language of disbelief.

David Randolph continued: "The life I've been living in this world? It is the life Oliver created in the other world. I assumed your place, Ol, in a manner of speaking. Though I was almost twenty years older than you in this universe. Because to *not* do so would mean that everything else would change as a result.

Everything you'd achieved in your lifetime—everything—had to somehow be otherwise manifested. Or all would be lost for me. And so I followed your path, deliberately, diligently. I recreated in every way I could the effect you'd had on our world. That was my only way to know that *this* world would follow the path we'd intended, and to have it mirror our world back home."

In an instant, Davey understood why his father's accommodation was so opulent by Halo standards. His Dad was this world's version of Oliver Hart! Unfathomable.

"What happens to us informs our lives, Davey. An irrefutable fact. There's simply no escaping it. When young Oliver Hart was prevented from going swimming that day in this alternate universe, he had no idea, of course, that a tragic event in his life had narrowly been avoided. But that *I can do anything* attitude of yours, Ollie, and everything that resulted from it, including your injuries, *was* Oliver Hart. And it lit the fire of passion that burned within that young man." He smiled gently at Hart.

Davey looked to Hart. He appeared devastated.

"In truth, I could see what was happening a long way off. This young Hart's path in life had been altered. His behavior, his goals, everything about him, was different than it might have been had he suffered, and endured, that life-changing accident."

"And you couldn't do anything about it? You couldn't intercede in some way? Set him... me... on the right course?"

"This is a boy we're talking about, Ollie. You were such a young man when your accident happened. I can only imagine that, as you began your physical recovery, you also began to change in ways we

can only imagine. And in no way insignificant in this is how you may have changed in your *heart*. You were not to be the same man. The boy that you might otherwise have become, had it not been for that accident? He was a different person altogether. And yes, I felt helpless watching. You behaved recklessly, without fear of repercussion; neglecting your studies in favor of fun. I knew that you were running the risk of throwing it all away. I ask you, though... what was I to do?"

But Hart was annoyed. "So. Clearly, there is nothing waiting for me in this world. You're going to have to take me back, David."

"Wait a minute, Oliver," David Randolph insisted, his calm voice belying the weight of his warning. "If you think for a second that I'm going to let you—"

But Davey couldn't abide Hart any longer. "Look! If anyone is going home, it's me and my dad." Davey took no efforts to tone down the angry edge in his voice. He'd had enough of Hart.

Dr. Hart was furious. "Davey, you know quite clearly that there's not enough room in the Pod to accommodate us all. And I'm going back. At least in the other world I have people who know me. I'm a man who has achieved something..."

"And... what? You think you've got some sort of priority seating? Who would you have give up their spot for you? My dad? Who's already given ten— no, actually nearly forty—years of his life to advancing your personal cause? Or me, who got you over here in the first place? We should give up our seats so that *you* can change your mind and go back?"

"It's okay, son—"

"No, it's not," Davey insisted, surprising himself with his boldness. "Not to mention that in the other world, in *my* world, you're supposed to be dead."

Hart was immutable. "The world will just have to get over my sudden and shocking resurrection, then, won't they?" he said, his tone acidic.

"Look, Davey," his father intervened. "I appreciate your concerns, son. And we will have to work these issues out on the other side. Truth be told, I'd anticipated your reaction, Oliver," he said, speaking now to Hart. "Well, not quite *this* reaction. But I figured that you'd want to go back. We do have a Pod of our own here. We'll take two Pods. You can't fly yourself, Ollie, so obviously you'll have to be with one or the other of us. There's no way I'm going to take you and let you send Davey on his own. Davey will fly with you, and I'll follow, alone."

Although the anger and tension were not quite fully dissipated, Davey felt some reassurance from his father's words. That he would

again travel with Hart, and his father would go it alone? Of course Davey understood: one or the other of them would have to ride solo. But *no* solution to the pairings seemed fair from Davey's vantage, as all required that he and his dad split up. Now that they were finally reunited, separating from him was the last thing he wanted.

"Where are we going?" Davey asked out of curiosity, but truthfully he didn't really care. He was just happy to be trotting along beside his father.

"We have to make some arrangements for our trip," he answered, smiling. "I'm going to need some help getting the second Pod into the bay after you and Oliver have departed. I can't do it alone. We're going to talk to the one man who knows who and what I am. He's the one man in whose confidence I have laid all my worldly secrets. Secrets of this world and of ours. And he's the one man who can help me—help us—to leave this world for our own."

"I suppose..." Davey started, but stopped short.

"S'pose what, son?"

Ooh, yes. Son. That sounded right to Davey's ear. "Ummm... I was just going to say—I suppose you are going to have to, you know, like...die or something? In this world. To explain your departure, like Dr. Hart did?" Davey felt awkward just mentioning it.

David Randolph nodded somberly. And so, they walked in contemplative quiet for a few moments.

Davey broke the silence. "This person we're going to see... why not just use your ONE and send him a message? Or do you need to see him?" Davey was both excited and a little nervous. He felt in a strange way exposed, walking around out in the open in this foreign but familiar world.

"I thought by now you'd have figured out that your communications are not your own up here?"

Davey nodded. Yes... he'd been coming to that conclusion.

"Anyway, I do need to see him face-to-face. Besides, it gives me a chance to show my kid off to the only person who'd understand how incredibly proud I am to have him."

And Davey felt proud, too, hearing his dad speak of him this way.

"Of course, we need to leave Dr. Hart right where he is. Him, I can't explain. But you? I happen to know that a certain David Randolph who lives just around that corner doesn't ever rise much before eight A.M. at the best of times, even on school days when he has to be in class by eight-thirty." Davey's dad smiled knowingly. "So we don't have any fear of running into him just yet. Besides, now that I have you right here, I can't bear to let you out of my sight," he said, and threw his arm around Davey.

“So, I can sneak you around with me. Provided you keep your mouth shut, that is,” his father added, flashing him a smile. “By the way, I’ve been meaning to ask... *what’s* up with that green yack of yours?” Davey’s explanation drew a smile from him. He snorted: “Pffah... I’d recognized you *anywhere*, kid,” his dad snorted, and drew Davey closer, into a brief hug.

A smiling face greeted them as they approached from the other direction, sharing the same strip of sidewalk: “Good morning, Dr. Johnson.”

Davey’s dad smiled and offered a greeting in exchange as they passed.

“Dr. Johnson?” Davey whispered.

“Well, I couldn’t exactly be David Randolph, could I? That name was going to be taken just the year before I got here, when a little boy was born in California,” he said, smiling wistfully. “But I knew just how important that little boy—that alternate me—was going to be in my life as I prepared to take up Ollie’s life. So I changed my identity. To Simon Johnson. Named after my brother and father. Neither of whom you, sadly, ever had the pleasure of knowing.” His father paused for a composing moment. “Both of whom died in a house fire, back in the other world, when I was seven.”

Davey felt a sudden sadness for his father. A flash of unexpected kinship for this other fatherless son. But hope prevailed: “And in this world? You must have made that right?”

The grief that weighed in his father’s eyes was answer enough.

An ache in Davey’s heart came with his sudden understanding. “Oh...” leaked out of him in a groan. And took an icy grip on Davey’s soul. “Oh, Dad... No! No!... Dad?” he implored, wishing nothing more than for his father to tell him that, no, of course he was mistaken. That nothing could be further from the truth. Knowing, at the same time, that those words would not come. And that his father’s pain was so much greater than his own.

“Nothing would have been more instinctive, Davey. You know that. But I couldn’t,” his father said, his voice quavering. He paused a moment to pinch the bridge of his nose... to pinch back his tears. “What we said before... about Chaos Theory? I just *couldn’t*, Davey. Not and have it fly in the face of every lesson I’d learned through Ollie’s death. He was a different kid, *this* Ollie. Reckless. Raging testosterone. Just, so not the man I knew. He went to university, barely, but was flunking out when he and a drunken buddy drove home from a party together. The friend had been driving. But they were both drunk. Both killed. So, you see, I *couldn’t* arbitrarily take it upon myself to save my brother and father, Davey. Though, truth be

told, I had come over here with every intention to do so, while I waited for my chance to come home. But, for better, and for worse, that event—losing my dad and my brother—it changed me. Made me the man I grew up to be. And I *could not*, would not, take it upon myself to change this little David Randolph's life, not knowing what might befall him as a result."

His father paused, before continuing. "He's a happy man, Davey. With a great little family! Doing work that he loves. I see him outside playing with his son, and it fills my heart so much as to break it."

Davey could only watch his feet as they walked. He knew that if he looked up to meet his father's gaze—a gaze that was burning an assessing hole in him at that moment—all composure would be lost.

"I have plenty of regrets, son," Simon Johnson continued. "Mostly for making such a profoundly affecting choice without consulting you or your mom. But I *thought* I was doing it for the right reasons. That I'm not so sure about that any longer, is my own burden. At any rate, I am overjoyed to know you," he said, punctuating it with a pat on Davey's shoulder. "To have *my own* son back," he added, his tone full of marvel.

Davey looked up slightly at his father as they walked, who returned the eye contact. He was nearly as tall as his dad, and Davey felt a quiet comfort in the eye-to-eye gaze they exchanged.

His father threw his arm over Davey's shoulder. He smiled at his son. "I've missed so much, Davey. And I long to get home. To kiss your mom, if she'll allow it, with this wrinkly old puss of mine." He flashed that charming smile again. "Maybe earn a bit of her forgiveness. And, I may not be up for tackle football anymore, buddy, but I'd love to spend some time with you, doing whatever it is you enjoy. Whatever time I have left, Davey... it's yours. I'm only sorry that you've already lost so much. But if there is room in your heart for me, Davey, I hope you know that you have never, ever, not for an instant, left mine."

THE END

Well now, dear reader, what more can I say?
I do hate to leave you hanging this way.
There's more to this story, of that be sure,
For *your* Halotosis there's only one cure.

With Davey and dad still not quite at home,
On Dr. Hart, I could write yet a tome.
But as all good tales must, time comes to close,
Though perhaps this ending's not what you chose?

At least we've brought Davey the prize that he sought,
His hard work and courage weren't for nought.
To be with his father, the great puzzle solved.
With help, that one mystery resolved.

Don't want to wait for Book Two to divulge?
You want more, you say? I'm thrilled to indulge.
So here's one last puzzle, from me to you.
Want to know what comes next? Here's your best clue:

Z J F Z I R F H

Warmest regards,

A handwritten signature in black ink, appearing to read "Jan Hart". The signature is fluid and cursive, with a large loop at the beginning and a stylized "H" in the middle.

log on to www.HartsHalo.com for help solving this last puzzle

ABOUT THE AUTHOR

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